The IRON AGE

May 16, 1957

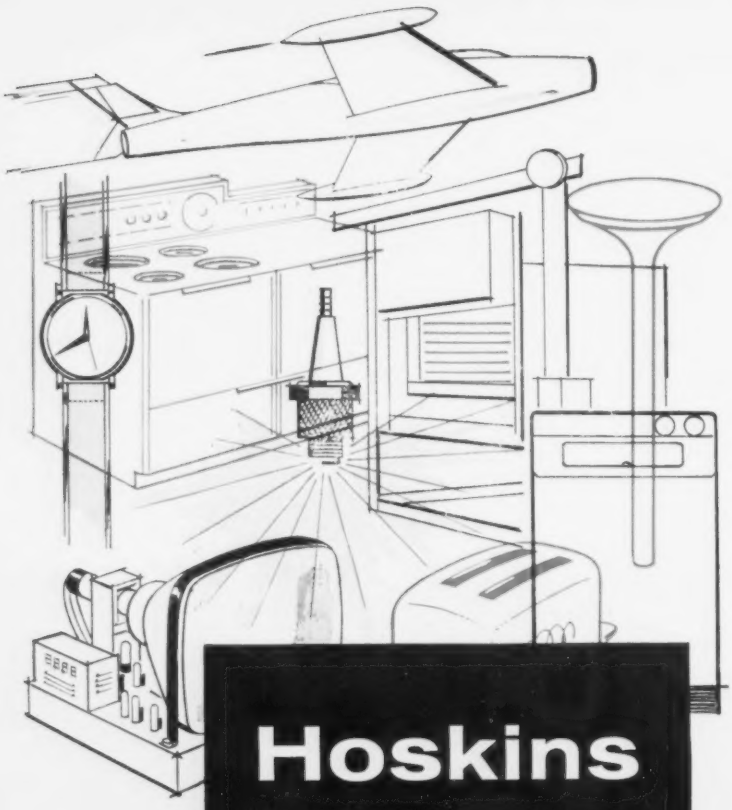
The National Metalworking Weekly

Auto Part Makers Go After Diverse Markets P. 107

What Buyers Can Expect From Steel Warehouses – P. 67

How To Rate Executive Performance – P. 72

Digest of the Week P.2-3



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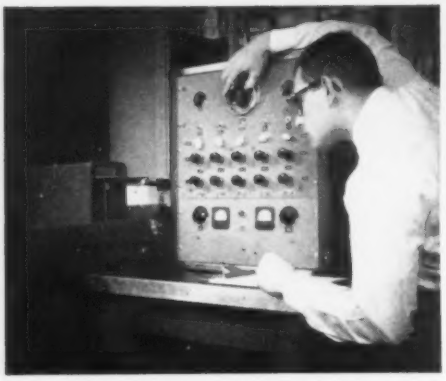

Only one of its kind—Designed and built by Hoskins, this special instrument provides accurate means of measuring temperature coefficient of resistor wire and ribbon. As part of our complete metallurgical research and development facilities, it is one more reason why you should "look to Hoskins first for the finest in quality controlled alloys!"

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Want more detailed information on Hoskins alloys, facilities and services? It's yours for the asking without obligation.

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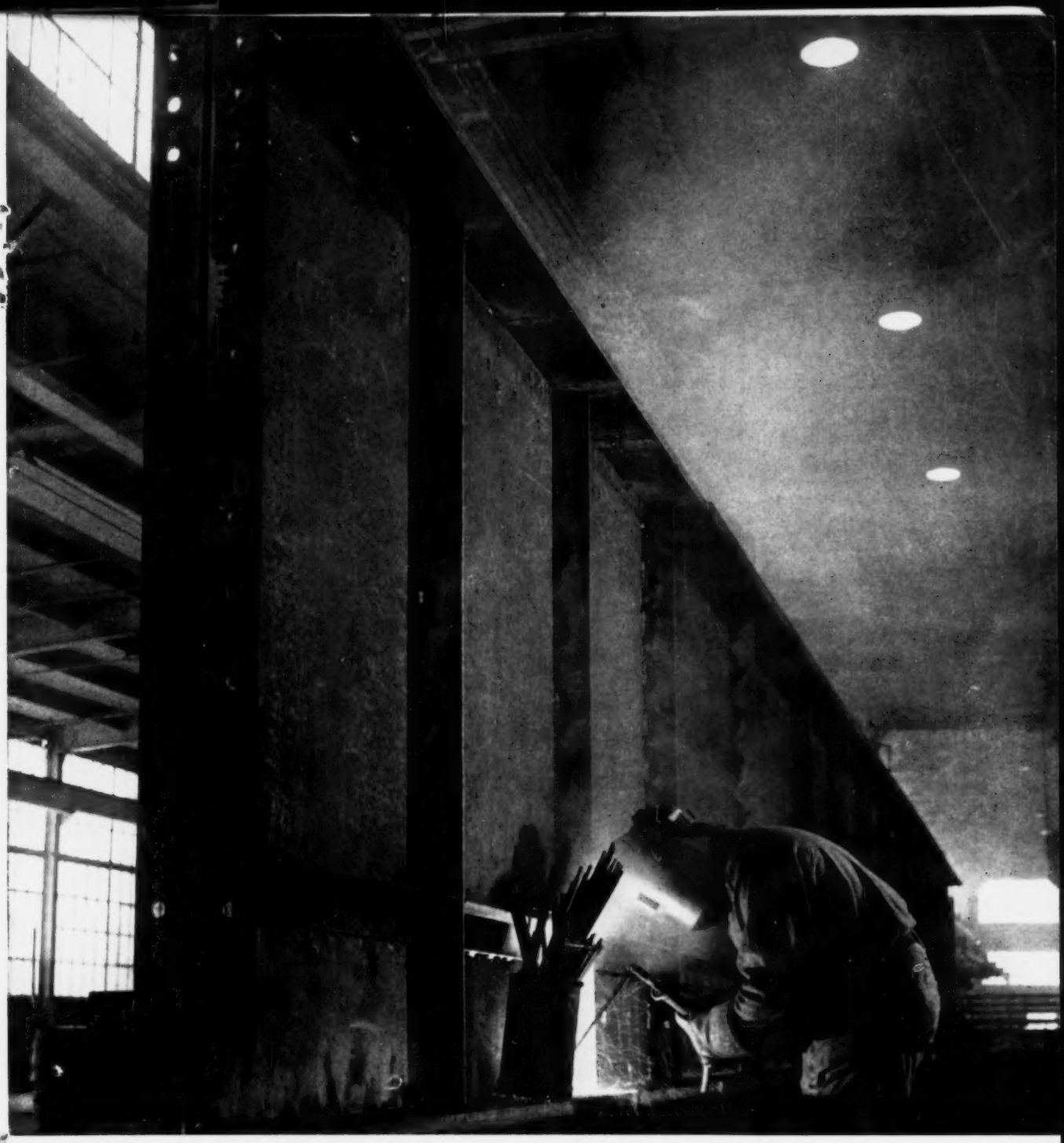

Welding Plate Girder for New York City School

This 65-ft-long welded plate girder is shown being fabricated in the Allentown, Pa., shop of Lehigh Structural Steel Company for the new School of Printing in New York City. Made entirely from Bethlehem plate, the girder is 6 ft deep and weighs 10 tons. The flange plates are 2¼ in. thick, the webs ½ in. thick and the stiffeners ⅜ in. and ½ in. thick. The uniform quality of Bethlehem plates makes them ideally suited to weldment fabrication. The use of these plates, plus proper welding technique, gives assurance of sound welds every time. Bethlehem plates come in a full range of sheared and universal mill sizes.

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The IRON AGE

May 16, 1957—Vol. 179, No. 20

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NEWS DEVELOPMENTS

Steel Warehouses Sell Service, Lower Costs

Steel warehousemen take off after a bigger share of the steel market. A big point is selling lower

steel costs through extra services, higher cost of carrying unnecessary steel inventories. **P. 67**

Battle Looms Over Tungsten In Congress

Is there enough tungsten in the stockpile? Did Congress promise to support the domestic miners? These questions are the nub of a battle brewing in Congress. The cons have scored in the first round. But the fight is far from over. **P. 70**

Management Game Used In Executive Training

A new mathematical mockup has been introduced by the American Management Assn. to provide painless practice in making corporate decisions. Game pits teams against each other in battle for marketing success. **P. 73**

Machine Builders Get Government's View

Uncle Sam is a big customer. And he is a tax collector. The

Metalworking

HIGH-LEVEL TALKS: Lining up new products is the order of the day for auto suppliers who find diversification the best road to survival. Executive VP T. W. Kuhn (left) and President S. D. Den Uyl discuss plans for Bohn Aluminum & Brass Corp. **P. 107**

situation creates many problems. To get the answers from the source the National Machine Tool Builders held its Spring meeting in Washington. **P. 93**

Business Brings In Aid For Bargaining

When management sits down at the negotiating table it has a ready source of valuable aid. Industrial relations associations are its shock troops. **P. 76**

FEATURE ARTICLES

New Fastener Stays Strong At High Temperatures

Standard Pressed Steel's Hi Tm 9 fastener opens new design vistas for atomic and chemical processes. It was developed to cope with heat-strength problems on high-speed aircraft skins. **P. 110**

Fire Protection: It Pays Its Own Way

Fire protection can save you money even if you never have a fire. If you do, it can save your business. Through reduced premiums, sprinkler systems can pay for themselves in less than 4 years. Finance plans simplify buying. **P. 111**

Acid Etch Milling Is in Full Production

Chemical milling's been growing up fast. First it was aluminum. Now the accent's on chemical milling of high alloy steels and titanium. New twist is use of HC1. **P. 114**

Guide To Better High-Temperature Brazing

Good high-temperature brazing takes the right combination of essentials. Choosing the right brazing alloy is a starting point. Proper heating rate and a wise choice of protective atmosphere count heavily too. Check these points for best results. **P. 116**

How Castings Hold Their Dimensional Stability

One way to get better performance in engineered products is to hold closer tolerances. Another is to use materials which have good dimensional stability. A seven-year study run on Meehanite castings show a 9-in. test bar holds within 0.0001-in. **P. 120**

MARKETS & PRICES

Ceramics to Play a Bigger Role in Jet Age

High temperature ceramics are being called on to help fight heat, friction, and corrosion problems in new jet aircraft. Their value is established in exhaust systems; skin coatings may be next. **P. 74**

Air Suspension for Autos To Make 1958 Debut

Several major automakers are expected to introduce air-suspended frames. Low silhouette problems will be overcome. But it will mean a 10 to 15 pct cut in auto steel spring business. **P. 84**

How Less Overtime Rule Will Affect Aircraft

Recent Defense Dept. request that extra-hour work be eliminated in military plane building will have both benefits and drawbacks. Here's what it means to industry's metalworking suppliers. **P. 91**

Canada Gets More Steel From Home

Canadian rolling mills are turning out more than three-fourths of domestic steel needs, compared to less than one-half in 1951. **P. 69**

Mills Note Slight Pickup In Price Hedge Buying

Hedge buying against expected higher steel prices has given the steel market a slight lift. Talk of a price boost averaging $8.50 a ton or more is helping the trend along. Mills are hopeful. **P. 151**

NEXT WEEK

How Metalworking Is Building Good Labor Relations

Despite occasional blowups, labor and management in metalworking are doing a good job. An IRON AGE Special Survey Report brings you the story straight from the horse's mouth.

Smooth I. D. Tubing Simplifies Production of Hydraulic Cylinders

Machining and fabricating operations can be reduced or eliminated if tubing used in hydraulic cylinders has as near perfect a surface and as close size tolerances as commercially possible. To achieve these desired qualities, checking and rechecking are integral parts of the tube making operations.

For checking the tolerances of the special smooth I.D. of welded carbon steel mechanical tubing which is to be used for hydraulic cylinders, Walter Pilmer —one of the inspection crew at B&W's Alliance, Ohio, plant—is using a sensitive precision measuring instrument called a bore gage. This is only one of the many checks of the tube production cycle.

Years of experience and the most advanced equipment available anywhere result in B&W "special smooth I.D." mechanical tubing. This tubing is provided with a guaranteed maximum average micro-inch finish on the I.D. which makes it ready for use in many hydraulic systems on delivery. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pa.

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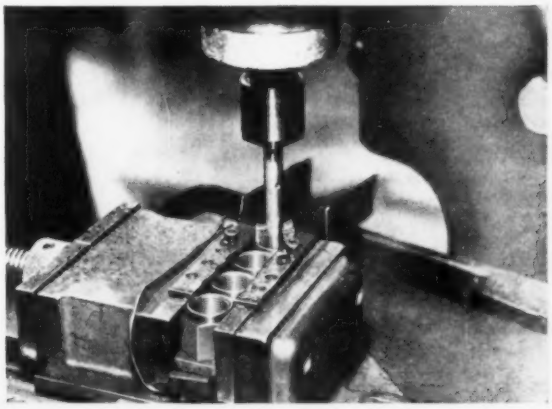
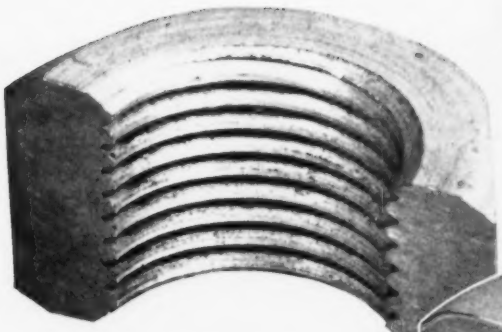
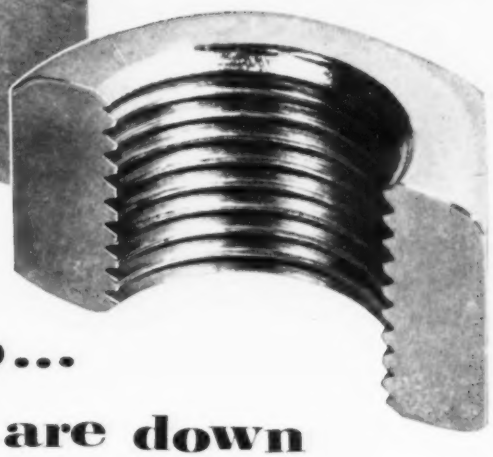
OSBORN BRUSHING METHODS worthy of your confidence

Removing chips and burrs from threads with Osborn Situfit Brushes assures a good fit.





Before Brushing



After Brushing

Cleaning up... when the chips are down

In precision tapping, tiny abrasive chips and burrs deep down in the threads can be removed easily to assure close fit and prevent excessive wear on thread gages.

Osborn power brushing performs this operation quickly and efficiently with the simplest of equipment. Rejects, a profit-taker for any company, are cut to a minimum.

An **O**sborn **B**rushing **A**nalysis, made in your plant without obligation, may point out a number of ways Osborn power brushing can improve your metal finishing operations. For details, write *The Osborn Manufacturing Company, Department FF-55, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

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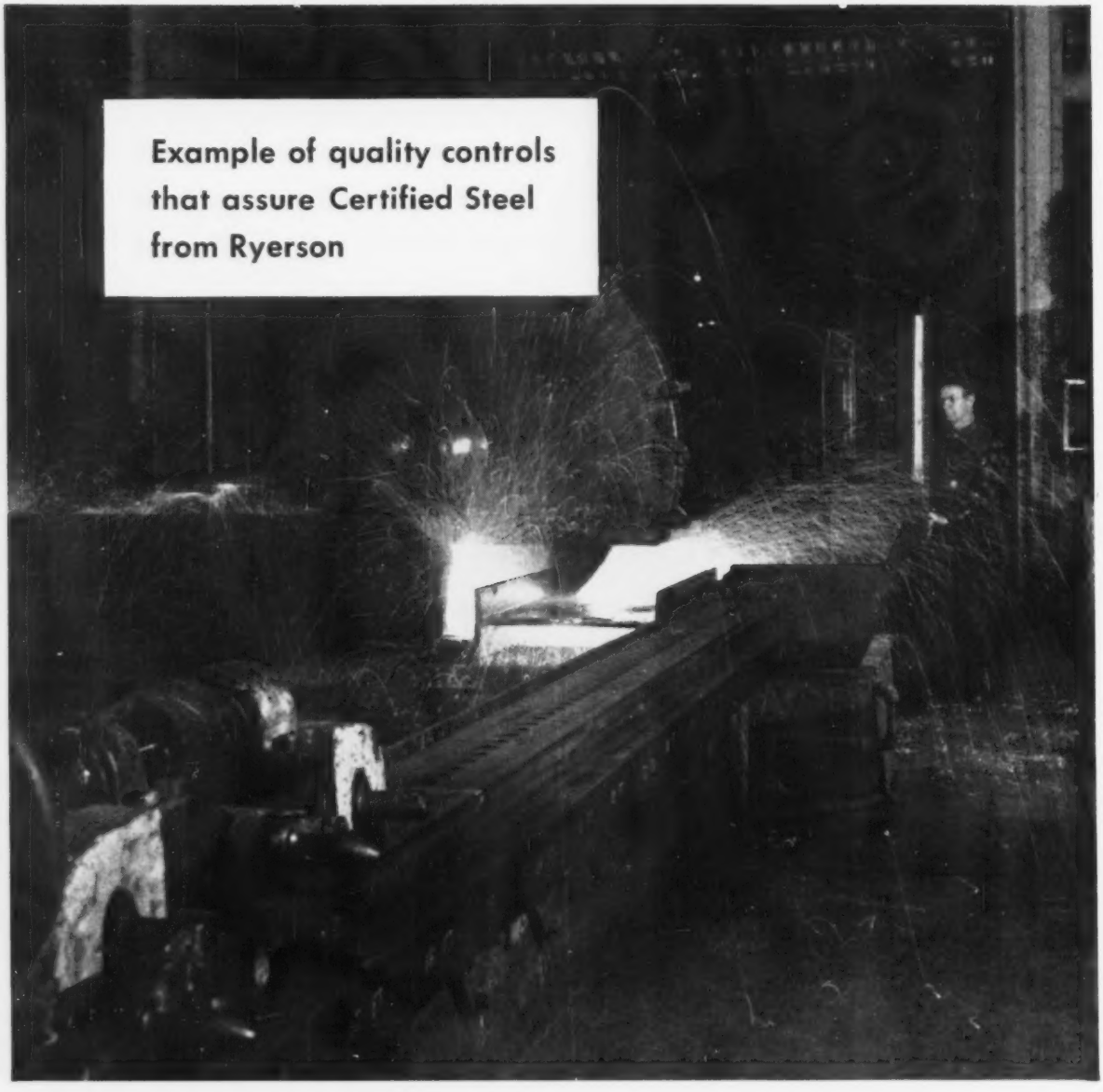

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Never-Ending Crises They Will Be With Us Always

If you think you are ever going to escape from world troubles—in your business or in your personal affairs—skip it. You will never make the grade. They will get worse before they ease.

But you can still be a realist about it. A sense of humor may help too. For instance; if we fall for more Soviet soft soap that is funny. Of course it's funny in a brutal way because we seem to fall for their claptrap when they are setting a trap for us.

But the Reds have some help over here too. Some people in their desperation or inability to face the facts seem to aid the Russians. They want us to fold up our tent; to stay on this side of the Atlantic; to drop out of the United Nations and, generally, to paddle our own canoe.

There are good arguments for the above. But there are good arguments for committing suicide, for becoming a bum, for taking to dope—and for letting others face our problems. But each of these things leads eventually to self destruction. And to follow a shallow path in foreign affairs could lead to national annihilation.

These crises that buffet us are real. Maybe they don't become quite as bad as we expect from the headlines. But behind all of them is the march of the Reds towards world domination.

When you and I forget that this is not a battle for peanuts but for everlasting freedom, we are sunk. We will make a lot of mistakes trying to find the answers. Some crises may be made worse by our actions. But that's part of facing realities.

We can't separate from our allies. Nor can we hide our heads in the sand where the Reds are concerned. We can't stop playing with the H-bomb when we know—or should know—that the Reds want us to do precisely that. We can't eliminate foreign aid any more than we can cut drastically our defense costs.

There is the mistaken idea in some quarters that defense, foreign aid and our attempts at being a world leader are parochial questions. Nothing could be farther from the bitter truth.

Everlastingly we are fighting for our freedom, for security from a police state, for a better world and for the eventual defeat of Communism.

Nothing will ever be normal, sane or commonplace as long as we have to remain strong, powerful, economically sound and able to defeat the Communist hordes if they call the tune.

There is no easy way out. Once you face that fact life becomes bearable, or worthwhile.

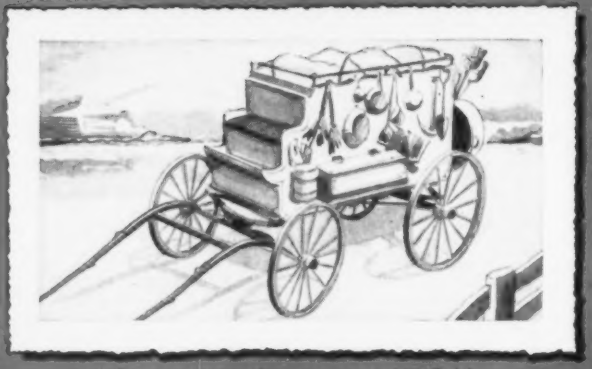
Tom Campbell

Editor-in-Chief

"BUY-WORD" for TOOLS for 75 years...the WILLIAMS DISTRIBUTOR

In Early Industrial America

An adjustable wrench, such as this 125 year old relic, was a great advance in the tools of the times. This one was picked up in the Onondaga Valley about 1870 by Horace Erdreich (a peddler).



Supplying customers with tools of the trade from his wagon or trading store, the pioneer distributor established a service essential to the growth of many industries.

Today, Distribution Keys Production

Williams Superrenches® are typical of the functionally designed, precision-made tools in the "Broadest Line of Its Kind". To make these tools available promptly, economically and conveniently, Williams continues to work hand-in-hand

with the Industrial Distributor...adding to quality products all extra advantages provided by the Distributor.

Offering prompt, personal service, local Williams Distributors save valuable time and money in ordering, production and inventory. Perhaps even more important is a service rendered which can not be bought...IDEAS. Sound, practical ideas based upon a variety of outside experiences...unbiased and beneficial.

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Demands—Or Else

Sir—As usual, I enjoyed reading your editorial in the Apr. 25 issue "Your Savings Bond Is a Badge of Freedom."

After reading in this same issue, "Organized Labor Is on the Spot," I could not refrain from commenting on the subhead "But Don't Look for Easier Bargaining."

From my own personal experience I wish to state that "bargaining" has gone out of union negotiations and been replaced with "demands or—else" and a business cannot prosper when closed down by a strike.—F. M. Whipple, Pres. and Gen. Mgr., The Springfield Metallic Casket Co., Inc., Springfield, O.

Beat the Bushes

Sir—We have read with interest your editorial "You Must Still Beat the Bushes!" Jan. 10, 1957, and would very much appreciate your permission to use this in a bulletin to our Field Engineers.—W. C. Richards, Jr., Vice Pres., The Bellows Co., Akron, O.

▪ Permission granted.—Ed.

Future Metallurgist?

Sir—I am interested in metallurgy and would like to become a metallurgical engineer.

But being a Filipino and residing here in the Philippines, I find myself handicapped for the following reasons: First, there is no school or university here in the Philippines which offers this course. Second, in consulting the college catalogues of some American universities and schools, a foreign student will need about $10,000 for a four-year course and a professional degree. The amount covers all expenses of stay and school fees.

Is there any advice or assistance you can offer which would enable me to study in the United States?

We need metallurgists here in the Philippines, and good ones especially. Our iron and steel industry is still in its infancy. Most, if not all, our mineral ores are shipped out to the United States and Japan. We import most of our finished products of iron and steel including pig iron.

We have relatively few small steel mills producing insufficient amounts of sheet metal, re-enforcing bars, wires, pipes and tubes, plates, etc., that still have further room for improvement in standards and quality.—A. G. Fernandez, 96 N. Domingo St., San Juan, Rizal, Philippines.

▪ Perhaps some of our readers can help.—Ed.

Water Conditioner

Sir—I would greatly appreciate the name and address of the company making the Packard Water Conditioner mentioned in the article on cutting phosphating costs on p. 99 of the May 2 issue.—F. J. Asselin, Plant Metallurgist, Chevrolet-Bay City, Bay City, Mich.

▪ Packard Mfg. Co., 2222 W. Beaver St., Jacksonville, Fla.—Ed.

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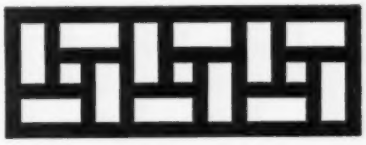
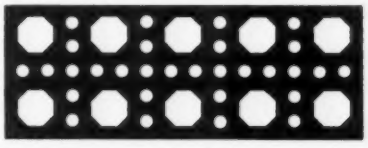
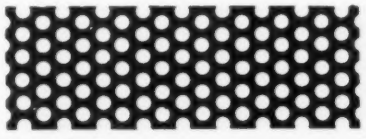


Perforated-Metal Sections supplied by Diamond to other manufacturers include **Grilles** and **Louvers,** for air conditioners, radios, juke boxes, television sets, automobile instruments, etc. Furnished also, for many modern products in **Rigidized Perforated Metal.**



Screens, for industrial processing, sterilizers, etc.; **Panels,** for space heaters, etc.; **Oil-Burner Chimneys; Perforated Cylinders,** for washing-machine and other centrifugal dryers; **Accoustical Sheet; Sound Baffles; Welded and Fabricated Assemblies** of all kinds.



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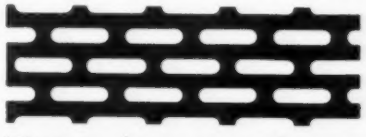

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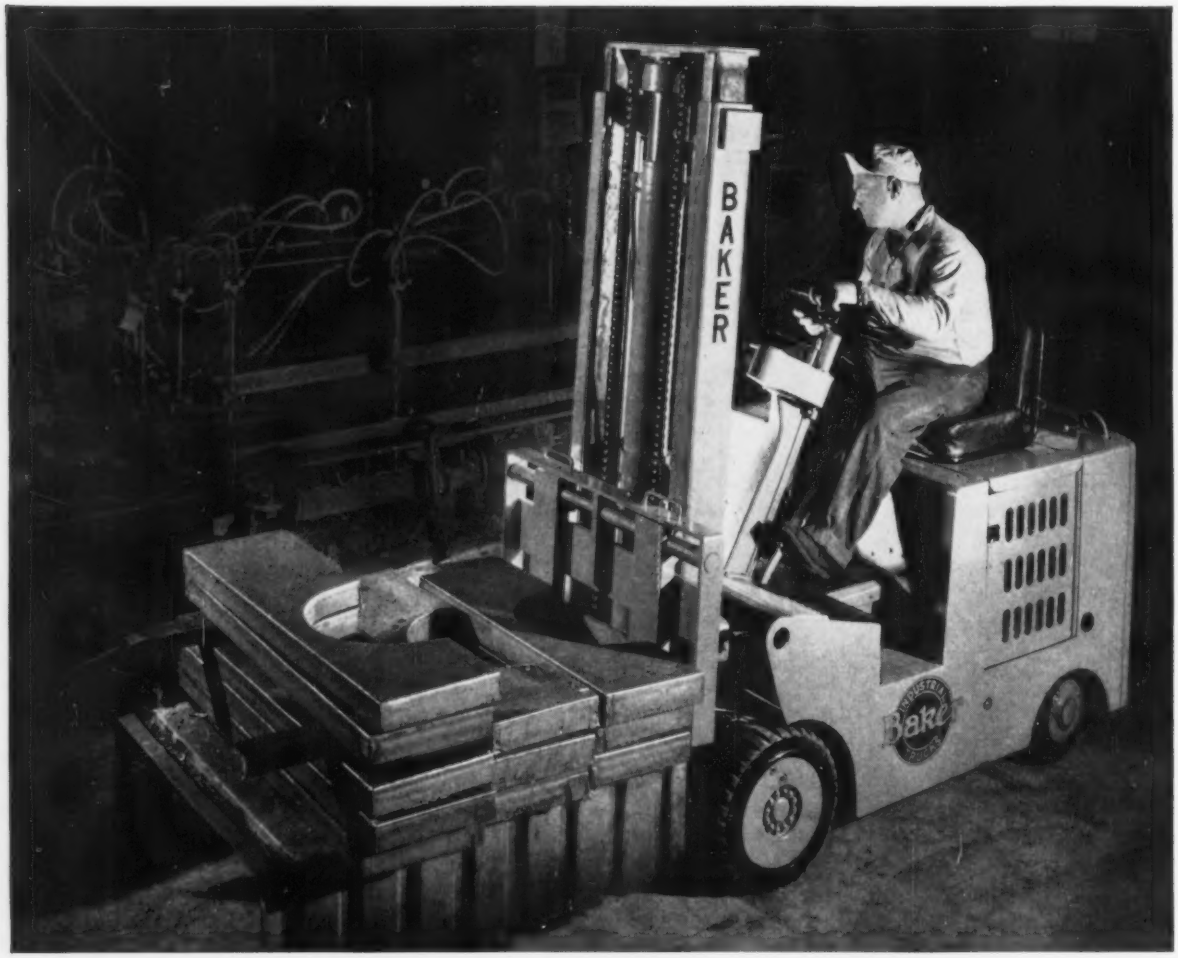


Extra stamina built into BAKER gas trucks makes them ideal for metalworking plants

One look at any of the Baker "FG" line of gas-powered fork trucks will show you why it is recognized as the most rugged in its class. But there are many things you don't see: the heavy-duty engine, designed expressly for industrial truck service; the sturdy Timken-power axle – integrated with the engine, transmission and clutch into a single unit, engineered for trouble-free service and long life; the Baker wide-angle steering axle – mounted longitudinally in jumbo rubber blocks to provide stability and absorb road shocks; the all-welded box-type frame with securely bolted counterweight; the channel-frame uprights with bronze inserts properly spaced to minimize sliding wear and add security in extended position.

These are but a few of the built-in features that mean more time on the job and more efficient performance in metalworking plants – where the work is heavy and the going rough.

Baker Gas Trucks are available in 2,000 to 7,000 pound capacities. For specific information, contact your nearest Baker sales office or write us direct.

Baker®
industrial trucks

THE BAKER-RAULANG COMPANY
1227 WEST 80th STREET • CLEVELAND 2, OHIO
A Subsidiary of Otis Elevator Company

7G2

FATIGUE CRACKS

"Cyclosteel"

Travel is broadening — as the saying goes.

From the standpoint of technical reporting, it is even more than that when it unearths good technical information and shares it with a large readership.

That, we feel, is precisely what Dr. Bhat accomplishes in his feature article on "Cyclosteel" (starting on p. 107). So please excuse us if we point with pride.

You may have heard bits and snatches about this impressive new steelmaking process. Dr. Bhat's article, as you'll see as you read on, is a complete treatment.

And that's where traveling comes in, along with its broadening effects. For Dr. Bhat traveled to England to get his information first-hand. We're glad he did. And we're glad he traveled back to THE IRON AGE with an authoritative article.

Scoop

In presenting Treasury Secretary George Humphrey's exclusive Iron Age article on fast tax write-offs and depreciation (April 18, p. 67), the editors realized his views might not be in complete agreement with those of many of our readers. These are complex problems and solutions don't come easily.

But they did think it helpful for readers to know his full views.

Just how helpful they didn't know until two or more weeks later. Then on May 3, Internal Revenue Commissioner Russel C. Harrington speaking before the National Machine Tool Builders Assoc. in Washington (for more on this see p. 93) recommended the article to the audience for Mr. Humphrey's views on depreciation.

And only last week testifying before the Senate Finance Committee Mr. Humphrey's remarks on fast tax amortization closely paralleled those of his Iron Age article.

Wacky Mottoes (Cont'd.)

I LIKE MY JOB

IT'S THE WORK I HATE

Thanks to Abrasives Div., Elgin National Watch Co.

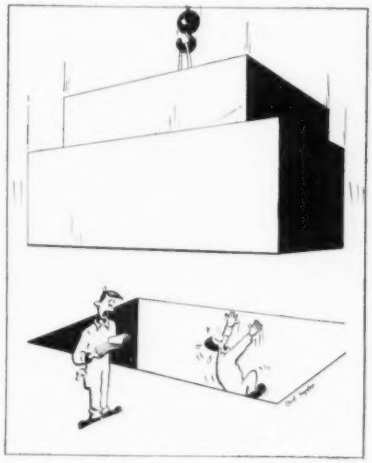
Puzzlers

Whoever heard of a peacock that could lay an egg . . . sometimes, you see we're real tricky, May 2 puzzler. And the winners, those who know something about the characteristics of peacocks: Felix W. Katz, Pittsburgh; Doris Lee, Ritter Co., Rochester; William Moss, Chicago Auto Wrecking Co.; Mrs. H. D. Hayes, Ford Motor Co, Dearborn; (poor Jim Mull).

New Puzzler

A man, wearing a black tie, went into a cheap restaurant and asked for a plate of pork and beans, pie and coffee. When he had finished his meal he paid the cashier, an attractive young girl, who said, "Thanks sailor."

How did she know that he was a sailor?



"Here it is . . . Hand Signals to Crane Operator. Number 1 . . . To stop crane from further lowering load. . . ."

YOUR ORDER FOR

POUND . . . OR

will be consistently uniform in dimensions and engineering properties if it's - - -

PENNROLD precision strip

Beryllium Copper
Phosphor Bronze
Nickel Silver
Brass
Chromium Copper
Stainless (incl. 17-7 P H)
Invar
Nickel Iron Alloys

0.0005 in. to 0.040 in. thick
0.090 in. to 6 in. wide

Some immediately available. Others rolled to order in 2 to 21 days. Can be supplied in coils or straight lengths with slit or filed edges — also cadmium plated.

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PRECISION PRODUCTS, INC.
501 Crescent Avenue • Reading, Pa.

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Boston — *F. G. STROKE, Wellesley 81, Mass.*
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Chicago — *R. A. BURKETT, Franklin Park, Ill.*
Houston — *RANDOLPH SALES CO.*
New York — *H. G. WILLIAMS, Ramsey, N. J.*
St. Louis — *J. A. CROWE*
Cleveland — *L. D. ALSPACH*
Los Angeles — *KRUSEN WIRE & STEEL CO.*

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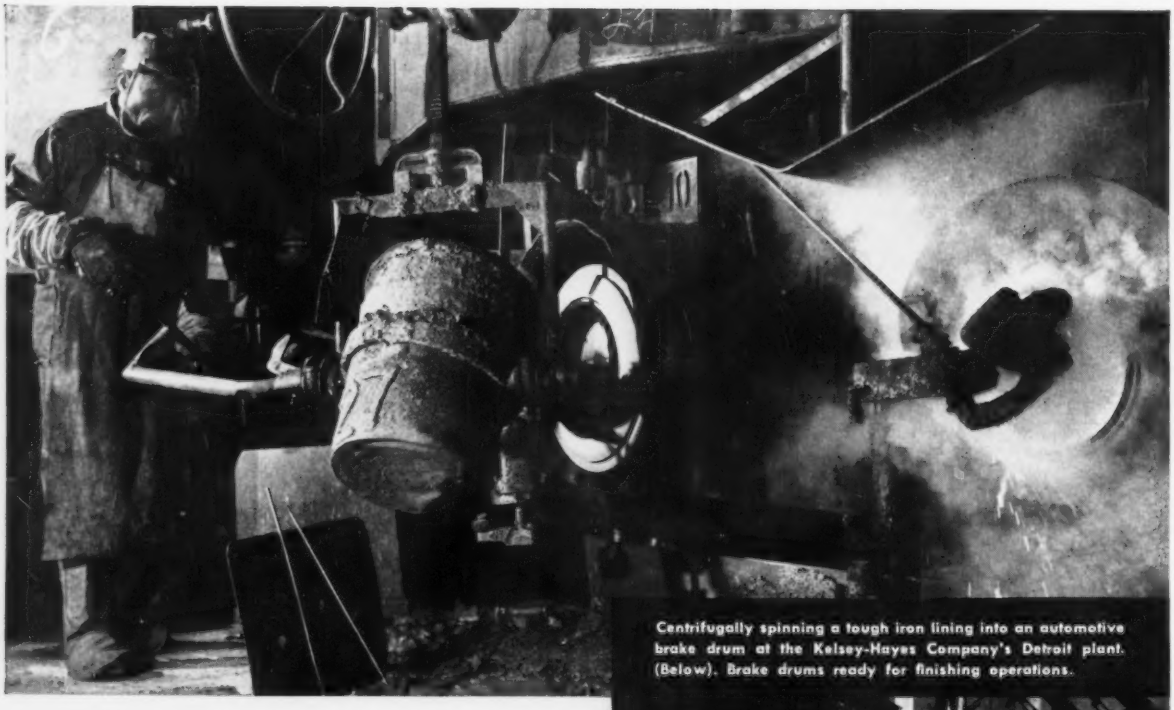


Centrifugally spinning a tough iron lining into an automotive brake drum at the Kelsey-Hayes Company's Detroit plant. (Below). Brake drums ready for finishing operations.

Kelsey-Hayes casts longer wearing brake drums with Hanna pig iron

Kelsey-Hayes is a key supplier to the auto industry. One of its leading products is a brake drum with a centrifugally spun iron lining. Kelsey-Hayes also produces thousands of sand cast brake drums. Strict uniformity of each melt is of major importance to Kelsey-Hayes.

To maintain their high standards, Kelsey-Hayes uses thousands of tons of Hanna Malleable Pig Iron annually.

Kelsey-Hayes, like the many other Hanna customers, knows that for pig iron of high metallurgical quality and analysis, it can always depend on Hanna.

Hanna makes all regular grades of pig iron, as well as HannaTite and Hanna Silvery, available in two sizes—the 38-pound pig and the 10-pound HannaTen ingot. Hanna qualities contribute to the production of denser, stronger castings with uniform machining qualities. These features are particularly beneficial in HannaTite—a specially made iron, possessing extra-fine grain structure with smaller, uniformly distributed graphite flakes.

HANNA
THE BEST KNOWN NAME IN IRON

THE HANNA FURNACE CORPORATION
Buffalo • Detroit • New York • Philadelphia
Merchant Pig Iron Division of
NATIONAL STEEL CORPORATION

EXHIBITS, MEETINGS

Design Engineering Show — May 20-23, New York. (Clapp & Poliak, 341 Madison Ave., N. Y. 17).

Western Plant Maintenance & Engineering Show — June 11-13, San Francisco. (Clapp & Poliak, 681 Market St., San Francisco).

Packaging & Handling Show—Oct. 28-31, Atlantic City. (SIPMHE, One Gateway Center, Pittsburgh 22).

Metal Show — Nov. 2-8, Chicago. (American Society for Metals, 7301 Euclid Ave., Cleveland 3).

MAY

Industrial Heating Equipment Assn. —Spring meeting, May 19-22, The Homestead, Hot Springs, Va. Society headquarters, 1145 19th St., N. W., Washington, D. C.

American Society of Mechanical Engineers—Oil & Gas Power Div. —Annual conference and exhibit on developments in production of power from oil and gas, May 20-23, Kentucky Hotel, Louisville, Ky. Society headquarters, 29 W. 39th St., New York.

American Iron and Steel Institute —65th general meeting of members, May 22-23, Waldorf-Astoria Hotel, New York. Society headquarters, 150 E. 42nd St., New York.

American Society For Quality Control—Eleventh annual convention, May 22-24, Sheraton-Cadillac Hotel, Detroit. Information: Wade R. Weaver, Registrar, Republic Steel Corp., Cleveland 1, O.

American Institute of Steel Construction — Annual national engineering conference, May 27-28, Edgewater Beach Hotel, Chicago. Society headquarters, 101 Park Ave., New York.

Institute of Mining and Metallurgical Engineers — Southern Calif.

Continued on P. 16

How DOUGLAS

saved 25,000 manhours!

With SPEED-D-BURR PRECISION BARREL FINISHING*

An Incredible $140,000.00 in Dollar Savings!

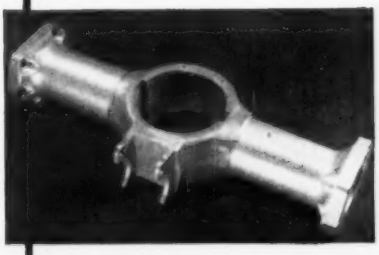
Time consuming handwork, production delays, difficulty in controlling uniformity and high costs in deburring a wide variety of parts in short runs was a problem faced by Douglas Aircraft. Turning to precision barrel finishing as a possible solution, a survey of various types of equipment and sample lot testing of many parts followed. SPEED-D-BURR engineers recommended a 4 unit installation to begin production *(picture above)*. Within a few weeks, savings began to mount, parts were being turned out faster than ever before and close tolerance finish quality was greatly improved on widely diversified parts from a 30" long casting to small washers—all in the same SPEED-D-BURR installation. Time study records indicated that projected manhour savings would reach 25,000 for the year with a dollar savings of $140,000.00 *(more than 10 times the equipment cost)*.

Like to read the whole story? Ask for Speed-D-Burr Folder DA-1...

ALSO WRITE FOR CATALOGS:

- *How to Cut Production Costs 80% or More*
- *The Futurama Series*
- *The Mity-Mite Series*
- *Media and Compounds*
- *Hot Sawdust Barrels*
- *Handling and Separating Equip.*

*As told in Iron Age Magazine — August 2, 1956



ONE SAVINGS EXAMPLE

Part No. 5638557-3

Hand Deburr . . .	$11.25 each
Speed-D-Burr . . .	.50 each
SAVINGS	$10.75 each

This is just one of many parts on which exceptional savings were made using SPEED-D-BURR Precision Barrel Finishing.

Service Is Our Most Important Product . . . It Does Not Cost . . . IT PAYS!

SPEED-D-BURR CORPORATION — PRECISION BARREL FINISHING — DESIGNERS • ENGINEERS • MANUFACTURERS

THE WORLD'S MOST COMPLETE LINE OF PRECISION BARREL FINISHING EQUIPMENT & SUPPLIES

SPEED-D-BURR CORPORATION

3613 SAN FERNANDO RD., GLENDALE 4, CALIF.

Distributorships available in some key areas . . . to complete our national sales network.

New Snyder Special Transfer Replaces Automation in Processing Forged Steel

Special Features of Snyder Machine No. 55-44

1. Production: 146 pieces per hour.
2. 26 Stations: 28 Operations per piece: 2 milling, 1 sawing, 4 hollow milling, 3 reaming, 1 countersinking, 10 drilling, 5 spotfacing, 1 threading and 1 tapping.
3. Palletized fixtures each carrying two parts.
4. Parts quickly and accurately clamped and located and unclamped by combination torque wrenches and hydraulically operated mechanisms at Stations 1 and 26.
5. Ten individual base segments provide maximum flexibility for future part design changes.
6. Ample room between segments for tool changes and maintenance.
7. Motorized fixture return conveyor with fixture washing unit.
8. Ample chip and coolant facilities.

Standard Features of Snyder Machines

1. SNYDER SELF-CONTAINED UNITS and other units equipped with hardened and ground ways.
2. Threading and tap heads equipped with individual leadscrew spindles.
3. Minimum downtime for tool changes because spindles are arranged for pre-set cutting tools.
4. Standard and special parts interchangeable for speed and economy in maintenance.
5. Motorized automatic lubrication system for all moving parts.
6. Construction to J.I.C. Standards throughout.
7. Master Push Button Panel and Light Console at Station 1.
8. Each unit equipped with its own push button control station for ease of tool setup and manual operation of unit.
9. Electrical interlocks and full depth circuit throughout.
10. Panels equipped with SNYDER CIRCUIT SLEUTH.

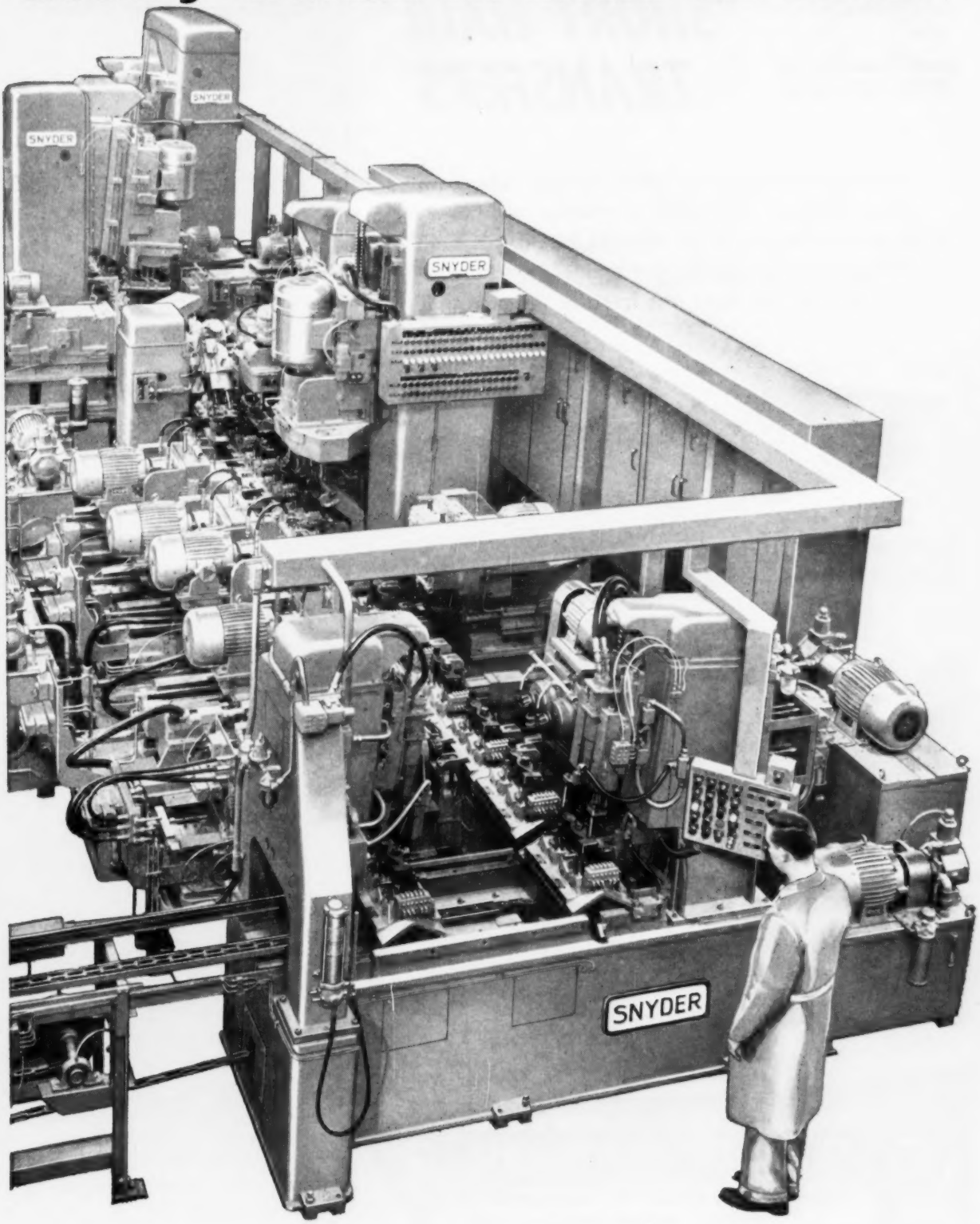
SNYDER

TOOL & ENGINEERING COMPANY

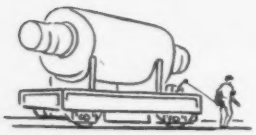
3400 E. LAFAYETTE • DETROIT 7, MICHIGAN

32 Years of Special Machine Tools with Automation

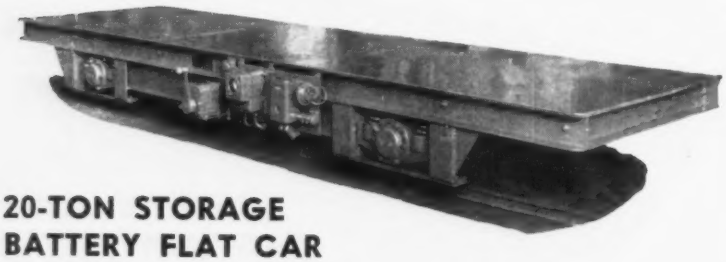
Several Semi-Standard Machines with Steering Knuckles for British Car Builder



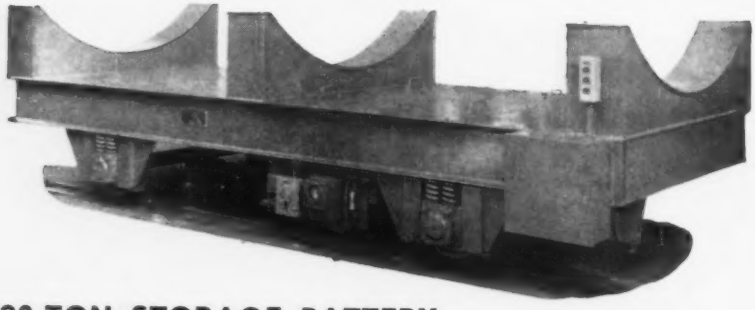
ATLAS SAFETY TYPE "SHORT HAUL" TRANSFERS



Atlas Safety-Type Transfers provide safe, low-cost service. Available with gas or diesel-electric, cable reel, or storage battery power. Atlas Transfers handle any type of load . . . and the heavier the load, the greater the savings.



20-TON STORAGE BATTERY FLAT CAR



20-TON STORAGE BATTERY WITH CRADLE FOR PIPE

Request "Walk-Along" Bulletin 1283

THE ATLAS CAR & MFG. CO.

1140 IVANHOE ROAD • CLEVELAND 10, OHIO

ENGINEERS & MANUFACTURERS SINCE 1896

EXHIBITS, MEETINGS

Continued from P. 13

Section—Regional reactive metals conference, May 28-29, Ambassador Hotel, Los Angeles. Society headquarters, 29 W. 39th St., New York.

JUNE

Institute of Radio Engineers—National symposium on production techniques, June 6-7, Hotel Willard, Washington, D. C. Information: 609 Monticello Dr., Falls Church, Va.

Manufacturing Chemists' Assn.—Annual meeting, June 6-8, The Greenbrier, White Sulphur Springs, W. Va. Society headquarters, 1625 Eye St., N. W., Washington 6, D. C.

The American Society of Mechanical Engineers—Semi-annual meeting, June 9-13, Sheraton-Palace, San Francisco, Calif. Society headquarters, 29 W. 39th St., N. Y.

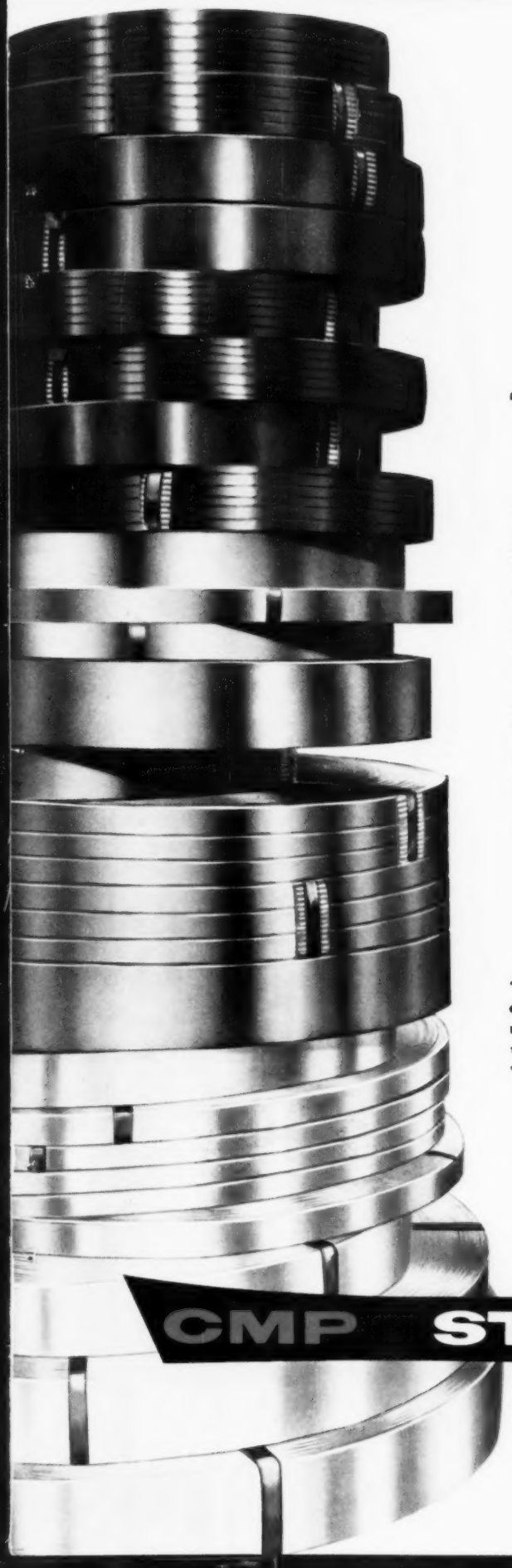
Malleable Founders' Society—Annual meeting, June 13-14, The Broadmoor, Colorado Springs, Colo. Society headquarters, 1800 Union Commerce Bldg., Cleveland.

Instrument Society of America — National symposium on instrumental methods of analysis, June 13-15, University of Chicago. Society headquarters, 313 Sixth Ave., Pittsburgh.

Pressed Metal Institute — Annual national sales conference for the metal stamping industry, June 14, Hotel Carter, Cleveland. Society headquarters, 3673 Lee Rd., Cleveland.

Assn. of Steel Distributors, Inc.—Steel distribution seminar, June 14-17, Michigan State University, Lansing, Mich. Society headquarters, 29 Broadway, New York.

American Society for Testing Materials — Annual meeting with sessions on varied fields of materials technology, June 17-21, Chalfonte-Haddon Hall, Atlantic City. Society headquarters, 1916 Race St., Philadelphia.



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"RESTRICTED SPECIFICATION" COLD ROLLED STRIP STEEL

Metal fabricators who rely on CMP for cold rolled strip steel enjoy the comfortable feeling of knowing that no better source exists for specialty strip products.

That's CMP strength—the ability to supply both standard and restricted specifications in a wide range of cold rolled strip steel grades and qualities from any one of three plants similarly equipped.

CMP does exactly that. Customers' orders involving restricted specifications can be processed at any one of three CMP plants with assurance of duplication of quality and processing and uniformity of result.

Your inquiries will be welcome, too.

THE COLD METAL PRODUCTS CO.
GENERAL OFFICES: YOUNGSTOWN 1, OHIO
PLANTS: YOUNGSTOWN, INDIANAPOLIS AND LOS ANGELES
SALES OFFICES: NEW YORK - CLEVELAND - DETROIT - INDIANAPOLIS
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Try CMP for 3 in 1 Service
Low Carbon, High Carbon—Annealed or Tempered, Stainless, Alloy, Electro Zinc Coated

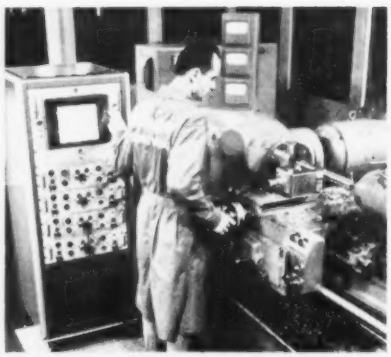
CMP STRIP STEEL

OUT FOR 22 MINUTES—

Seeing a "Technical Metal Working Film you'll never forget"

You are invited to view, in your own plant at a time of your own choosing, a sound moving picture that well may cause you to reconsider the whole approach to your metal turning processes. And we predict that you will wish to have it re-run, perhaps several times, for selected management, production and engineering personnel.

For the new Monarch film "When The Chips Are Down" is *not* a sales or a product demonstration film. It is a factual study of the progress of our Machinability and Development Laboratories. It is a report of their scientific attack on such turning problems as feed, speed, and tooling expressed in the obtaining of data on cutting tool forces, tool geometry, work distortion, and vibration; on chemical and metallurgical properties of metal; on shear properties; on cutting fluids. And it shows the practical applications of such research in improved design of lathes and lathe components. Also it makes possible a service to our customers whereby we help them achieve optimum cutting conditions, top quality and accuracy, highest production returns.



Special instrumentation applied to Monarch Machinability Test Lathe.

If you will just write us (Dept. A) on your business letterhead, we will gladly make arrangements for a viewing—without the slightest obligation. You might well find it the most rewarding twenty-two minutes of a busy day.

Monarch
TURNING MACHINES
ACCURACY • ECONOMY • LONG LIFE
FOR A GOOD TURN FASTER ... TURN TO MONARCH

THE MONARCH MACHINE TOOL COMPANY
SIDNEY, OHIO

She's enjoying an afternoon by a beautiful pool

Mr. V. N. Agather, Vice President of Production at La Consolidada, S. A., Mexico, Manufacturers of Malla-Lac—Concrete Reinforcing Wire Mesh.

—he helped make it possible with Sciaky Resistance Welding Techniques

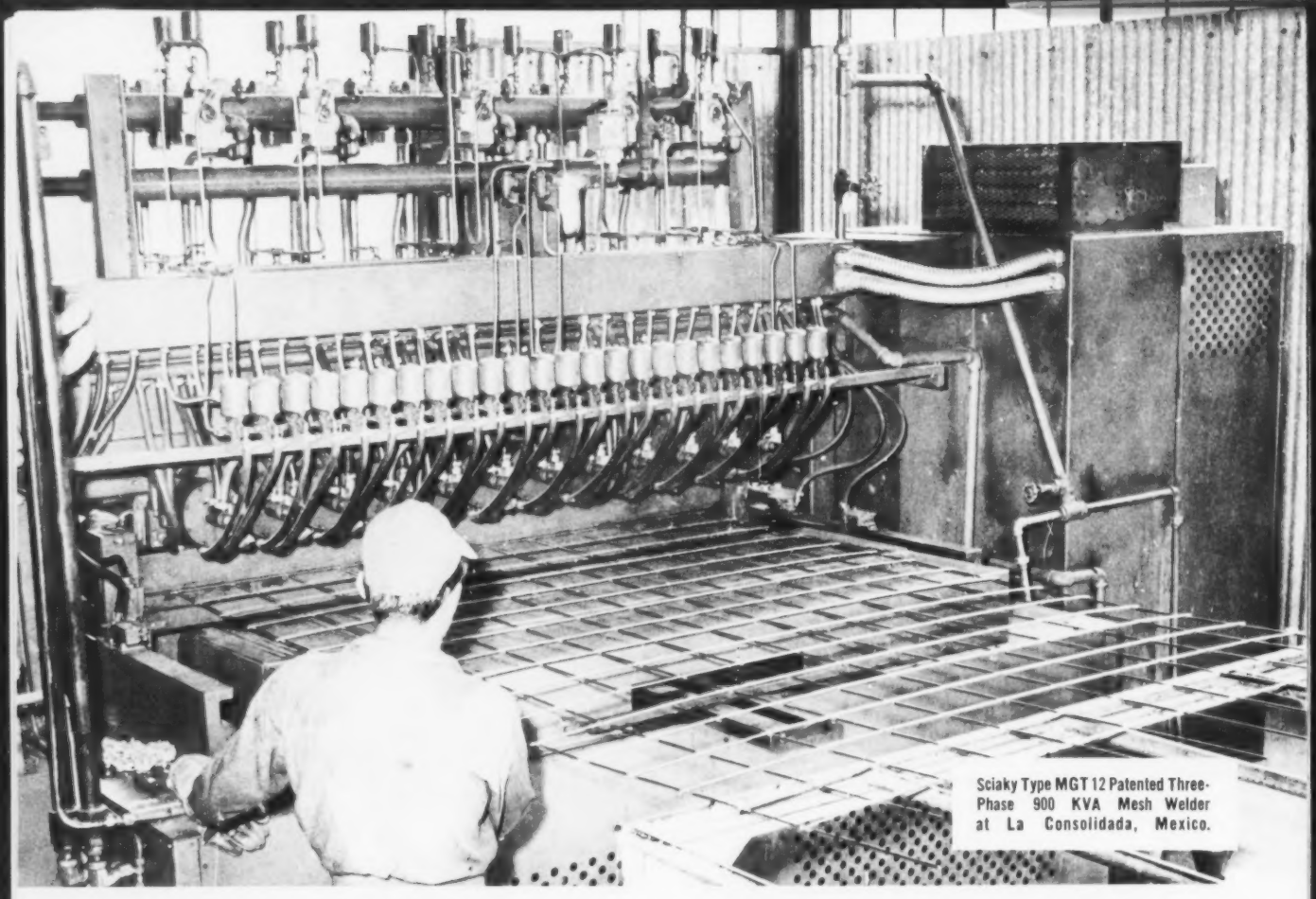
Not only are Mexican swimming pools made with La Consolidada concrete reinforcing wire mesh, but office buildings, commercial structures and private homes as well. Critical shortages of lumber and fabricated structural members in Mexico force the extensive use of reinforced concrete construction.

As the leading Mexican manufacturer of steel wire and wire products, industrial fasteners and merchant bar products, it was natural for La Consolidada to become the first to introduce resistance welded wire mesh for concrete reinforcing.

In their need for a production process that would satisfy their particular complex requirements, La Consolidada turned to Sciaky Resistance Welding Techniques exclusively. Because Sciaky Resistance Welding Techniques are designed to put the profits back into manufacturing! Turn the page for more information on how La Consolidada does it.

SCIAKY®

There are Sciaky plants in Chicago, Paris and London, as well as an Application Research Center in Los Angeles, California



Sciaky Type MGT 12 Patented Three-Phase 900 KVA Mesh Welder at La Consolidada, Mexico.

La Consolidada Offers 32% Savings in Steel to Building Construction with Concrete Reinforced Wire Mesh

***Sciaky Resistance Welding Techniques* used exclusively to introduce concrete reinforcing wire mesh to Mexico**

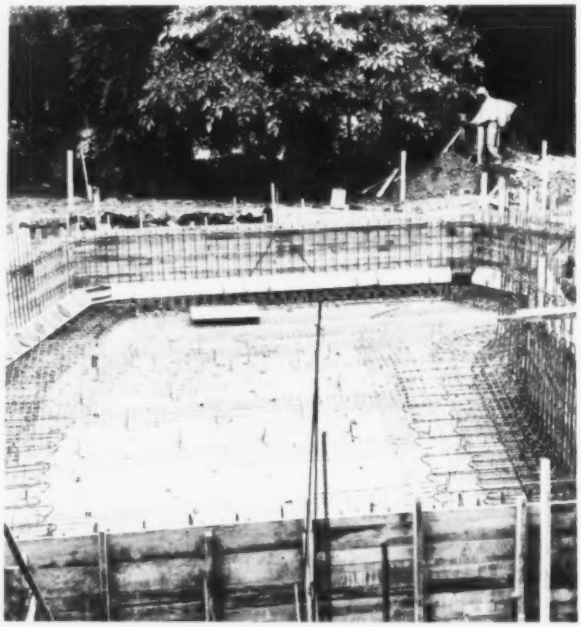
La Consolidada's wire mesh, called Malla-Lac, has received immediate, overwhelming acceptance and future production is already sold out. Much of this success is due to production methods and Sciaky equipment tailored to specific needs:

1. **Versatility to provide range of mesh and wire sizes.**
2. **Capacity to match needs.**
3. **Simplicity of operation and maintenance.**
4. **Dependability in heavy duty operation.**
5. **Lowest cost to put equipment in production.**
6. **Ability to get service in Mexico.**

Sciaky resistance welding techniques and equipment satisfy all of these requirements. It enables La Consolidada to sell Malla-Lac at a price competitive to reinforcing bar. It enables La Consolidada to produce a product of the quality necessary to building construction.

If *you* fasten metal products together to fabricate your products, take advantage of Sciaky Resistance Welding techniques—like La Consolidada does!

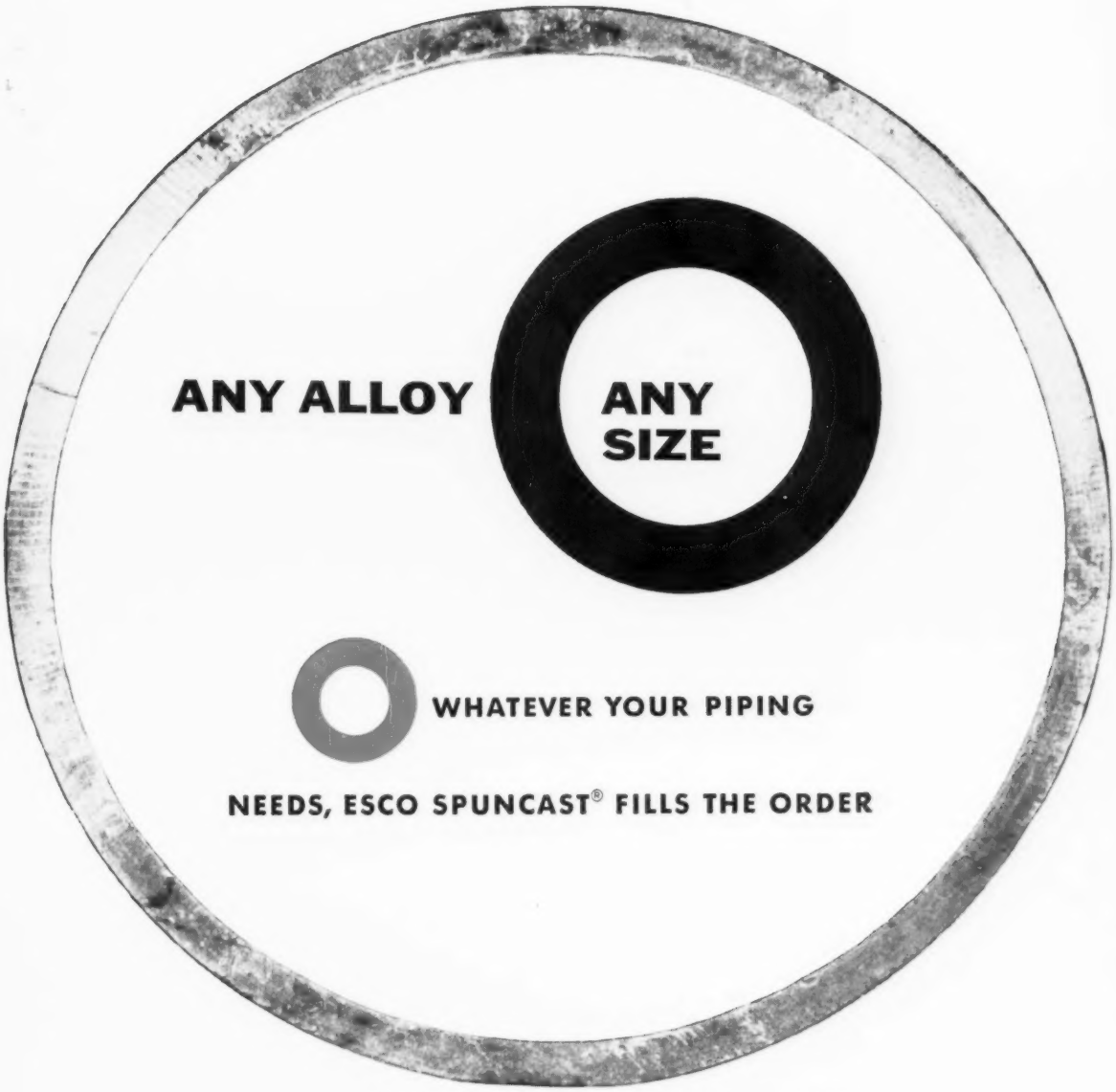
Further data is given in the publication "Resistance Welding At Work", Vol. 5, No. 2. Write for your copy.



La Consolidada Concrete Reinforcing Wire Mesh As Used In Construction of Swimming Pool.

Sciaky Bros., Inc., 4930 West 67th Street, Chicago 38, Ill., POrtsmouth 7-5600

SCIAKY®



Corrosion, heat, abrasion or vibration, you can reduce them all with *ESCO* Spuncast pipe. Centrifugally cast in a wide variety of *ESCO* alloy steels, heat treated and tested, *ESCO* Spuncast pipe will cut replacement costs in chemical, pulp and paper and petro-chemical plants, or in any other type of installation subject to severe conditions.

Available in special alloys, in sizes to 36″ OD and wall thickness from ¼″ up and in large or small quantities *ESCO* Spuncast Pipe is the greatest corrosion-resistant value your pipe dollars can buy.

Write for free booklet — "How to Cut Costs With *ESCO* Spuncast"

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MFG. PLANTS AT PORTLAND, ORE. AND DANVILLE, ILL.
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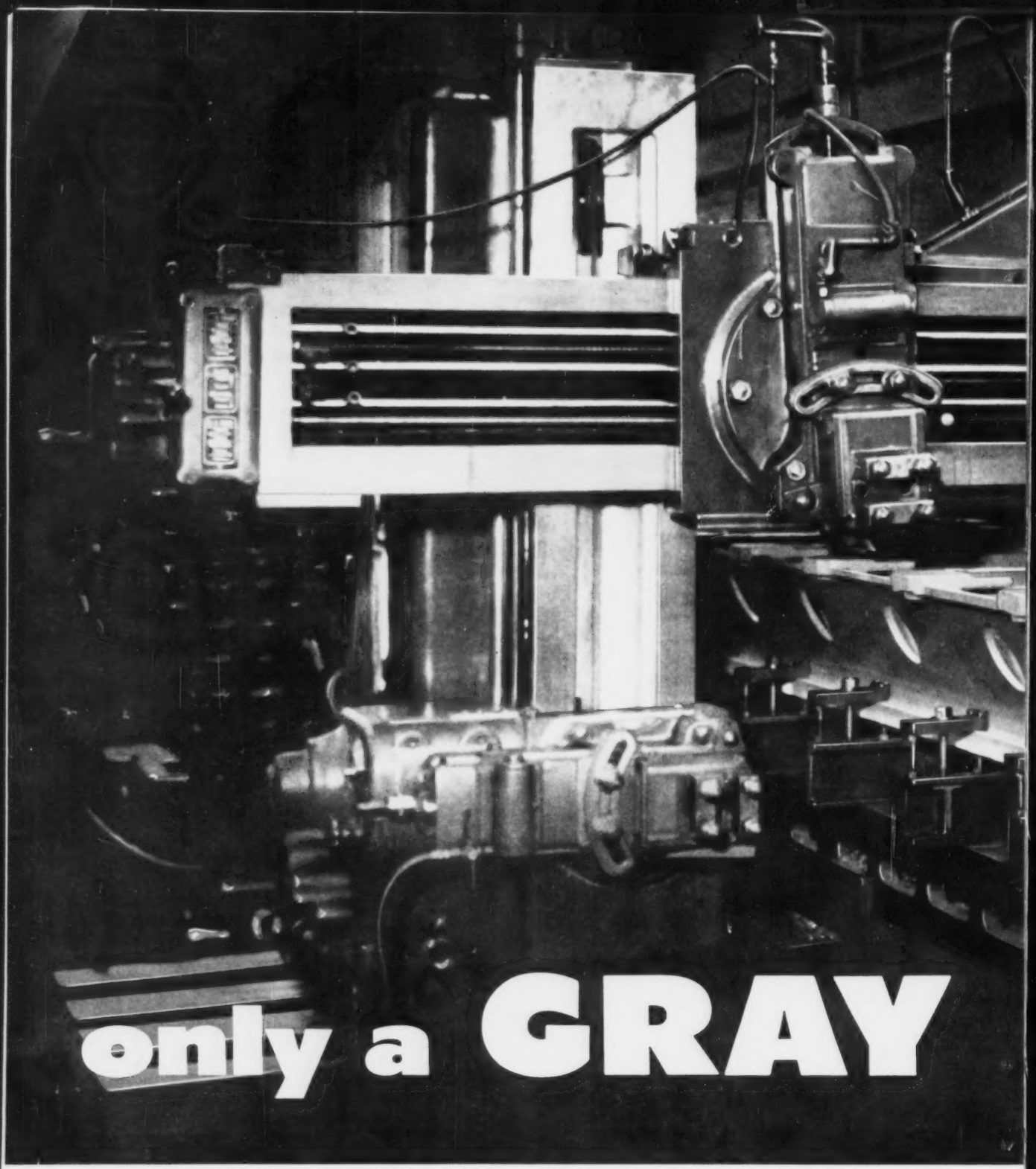


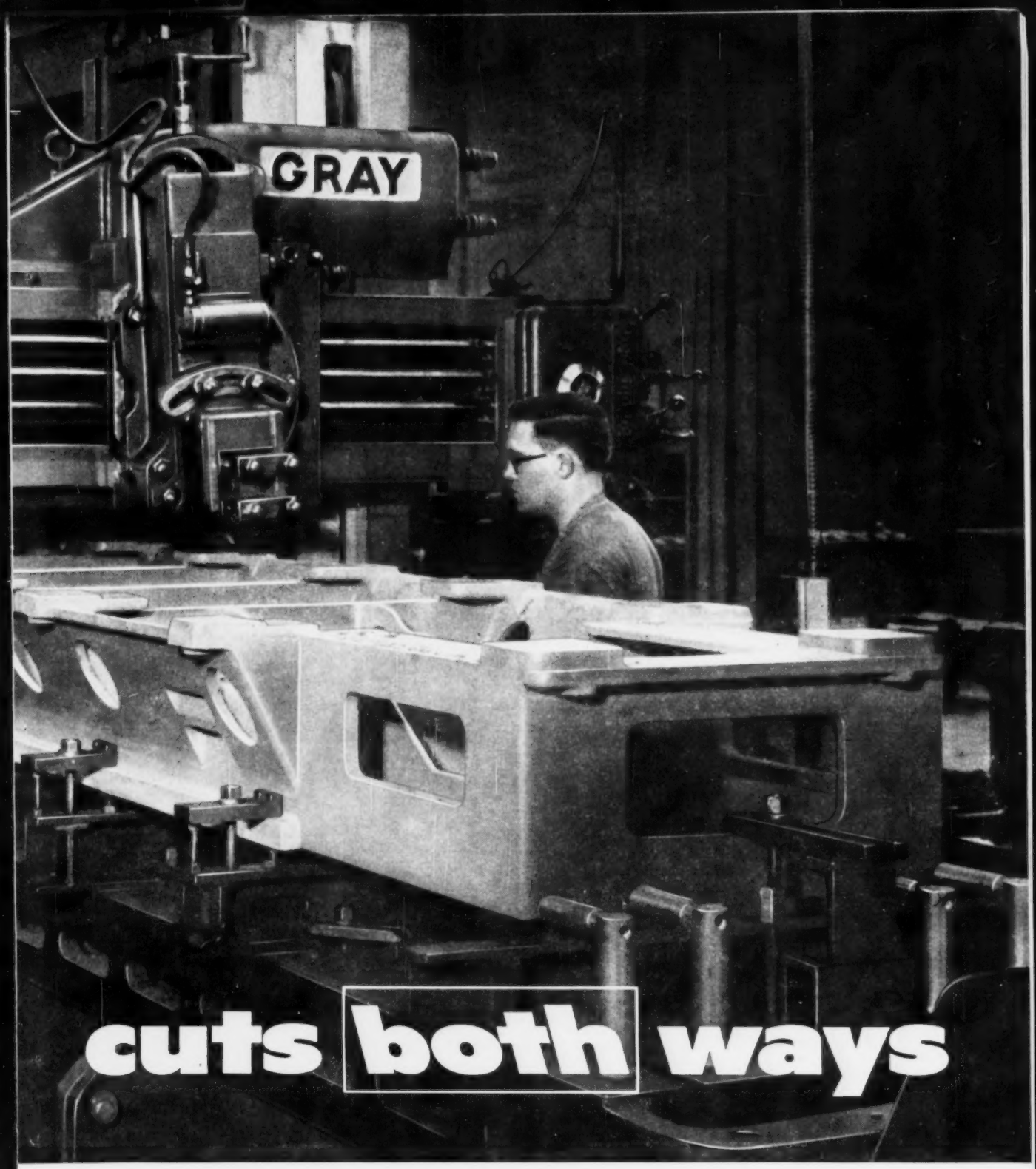
only a GRAY

Cuts going—cuts coming . . . that's "double-cutting" with the GRAY Universal Planer. At Textile Machine Works, Reading, Pennsylvania, this new GRAY is pictured double-cut carbide planing a Tricot Machine Base. Former floor to floor time of 62 hours has been slashed to 12 hours by the enormous productive potential of the new GRAY that cuts both ways.

The G. A. GRAY Co., Cincinnati, Ohio.

heavy-duty planing

The Gray Universal is the world's most powerful planer available for conventional planing. Its rigidity and speed are ideally suited for modern carbide cutting.



cuts both ways

double-cutting

The flick of a lever, the touch of a button permits double-cutting. Elimination of the idle stroke insures the world's most efficient flat surface machining. Only simple carbide tools are required.

triple-cutting

Rough and rough-finish plane at the same time. Rough by double-cut planing and simultaneously rough-finish with a single point tool. Then finish plane without a tool change.

cross planing

Eliminates extra settings by cross planing the occasional keyways, chamfered corners, and other troublesome small cross surfaces that formerly added hours to your set-up time.

Have a metal turning problem?

THE SOLUTION MAY BE A FAMOUS REX HIGH SPEED STEEL. REX IS THE STANDARD BY WHICH ALL HIGH SPEED STEELS ARE COMPARED — AND IT'S AVAILABLE FROM ALL LOCAL CRUCIBLE WAREHOUSE STOCKS.

Crucible REX M2-S, for example, has a wide hardening range. Although REX M2-S costs less, its red hardness is equal to the 18-4-1 type. And its superior toughness and good wear-resistance help make it ideal for many cutting, turning and broaching operations.

REX is just one of dozens of tool steel grades and types regularly stocked at all local Crucible warehouses.

What's more, Crucible warehouse service offers you unlimited assistance in selection or fabrication of special steels. And Crucible is the only specialty steel producer *fully integrated to the point of use*. That means control and responsibility from raw material to warehouse delivery to you.

STOCKS MAINTAINED OF:
Rex High Speed Steel . . . ALL grades of Tool Steel (including Die Casting Die and Plastic Mold Steel, Drill Rod, Tool Bits, and Hollow Tool Steel Bars) . . . Stainless Steel (Sheets, Bars, Wire, Billets, Electrodes) . . . Max-el, HY-Tuf, AISI Alloy . . . Onyx Spring, Hollow Drill Steel and other special purpose steels.

See us at N.A.P.A. Inform-A-Show
Atlantic City, May 26-29 — Booths 1, 2, 3, 4

CRUCIBLE WAREHOUSE SERVICE

Crucible Steel Company of America

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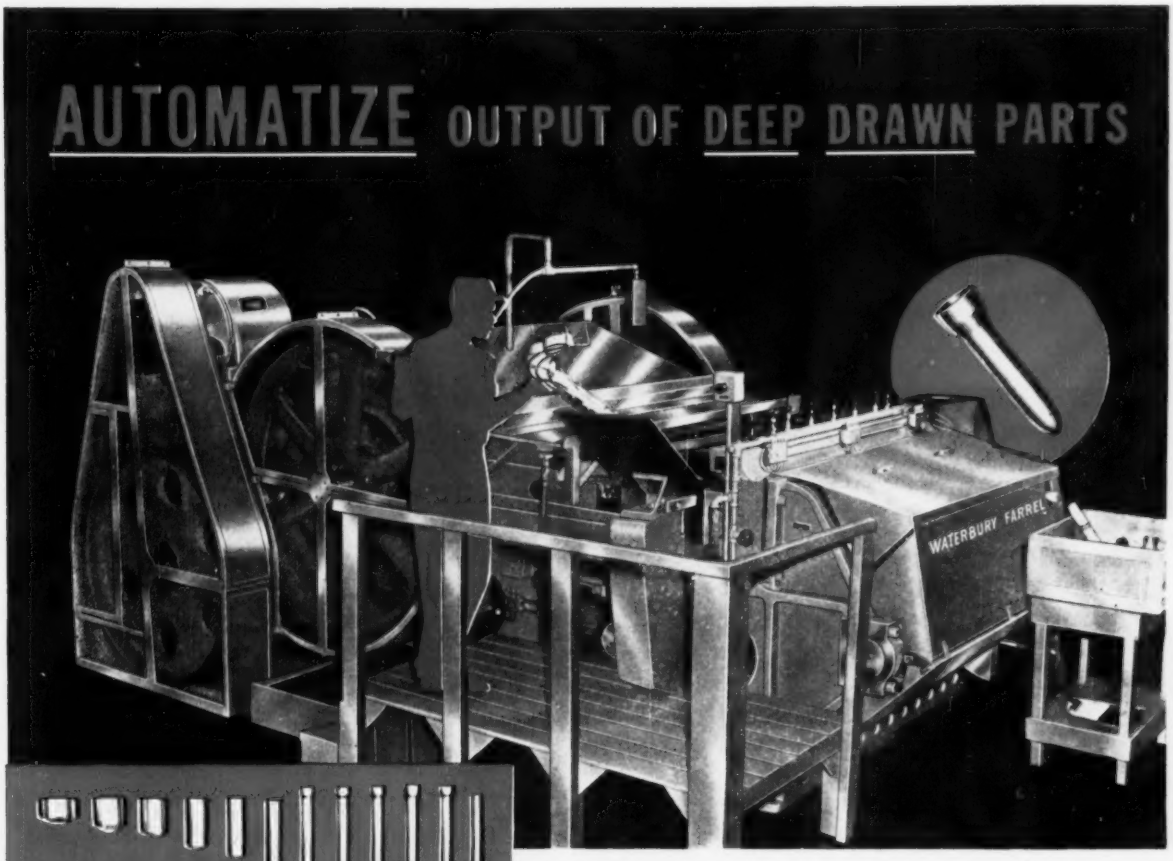
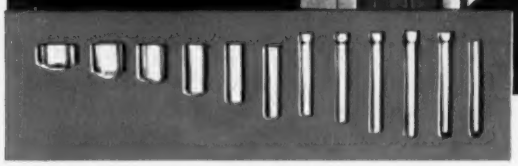
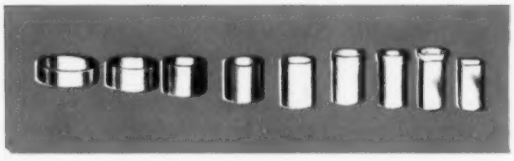
AUTOMATIZE OUTPUT OF DEEP DRAWN PARTS

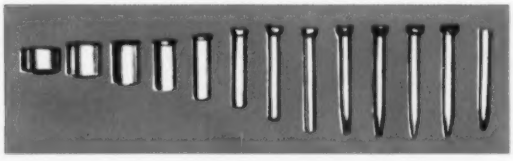




Knife handle made from .047 thick German silver on a #7-11 station machine. Length of shell, 4⅛"; Dia., ⅜"; production, 2280 pieces per hour.



1¾" sq. x 2½" long condenser can be made from .018" thick zinc on a #5-9 station machine. Production, 3600 cans per hour.



Ball point pen holder made from .014" thick brass on a #4-12 station machine. Part measures ⅛" Dia. x 3¾" long. Production, 4200 parts per hour.

Use WATERBURY FARREL Horizontal Redraw Presses For Low Cost, Mass Production

Continuous, progressive drawing on these multiple station presses automatizes the production of square, round, elliptical, straight or shouldered, deep drawn shells. And, the machine will perform such consecutive operations as drawing, bottom piercing, curling, fluting, clipping and other work.

No longer is it necessary to form these shells on single purpose presses, in separate operations requiring intermediate annealing and handling. Work progresses smoothly, continuously and automatically through these Horizontal Redraw Presses.

For automation in feeding material, Waterbury Farrel can supply (1) a cupping attachment for single machines to permit feeding strip stock, or, (2) a cupping press with gang tooling and a conveyor system for supplying cups to a bank of machines.

Write today for your free copy of CIRCULAR 926-M describing these machines and the wide range of sizes available.

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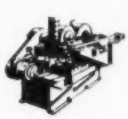
WATERBURY, CONN.
SALES OFFICES: Chicago • Cleveland • Millburn, N. J.

WATERBURY FARREL FOUNDED 1851
WF-36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it takes top cutter design to get best cutter performance!

BARBER-COLMAN offers

Special Form Development

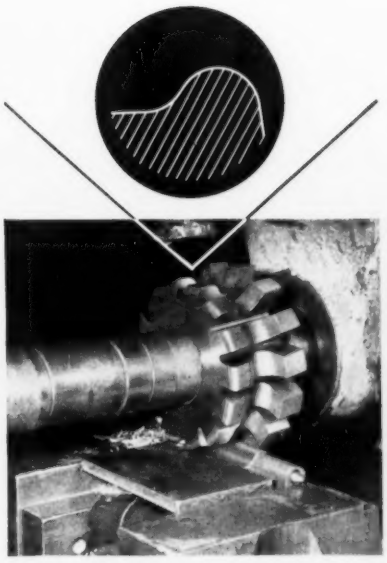
Special form-relieved cutters often allow several operations to be combined into one. Barber-Colman Engineers are experts in designing special tooth forms on form-relieved cutters for solving specific milling problems.

Our cutting tool division has the complete engineering, manufacturing and inspection facilities for making specially-designed form-relieved cutting tools of the finest quality. In addition to designing special forms, our engineers will design into the cutter such special features as axial side clearance, rake angles and helical flutes in any combination to produce maximum cutting efficiency. The best high-speed steel for the specific material to be cut is specified by our experienced engineering staff.

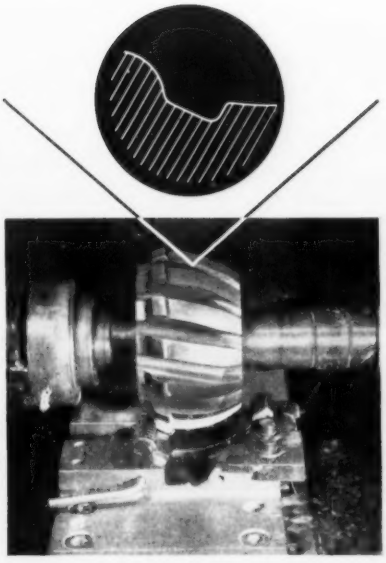
Barber-Colman form-relieved cutters require no "spot sharpening". Accurate face sharpening will maintain the correct form for the life of the cutter. This is true on all cutters including those with axial relief, rake or helical flutes.

Application of Axial Relief

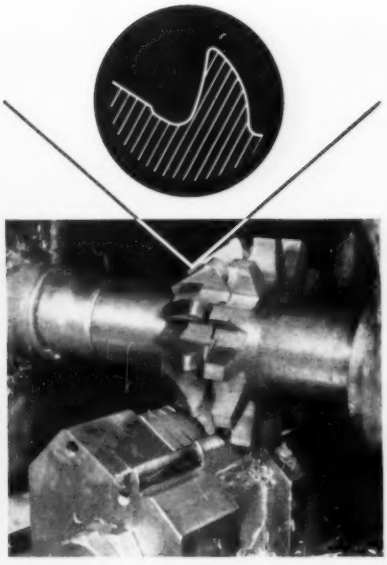
Surfaces which are in a plane perpendicular to the axis of the cutter, or nearly perpendicular, cannot be milled with a form-relieved cutter unless the cutter teeth are provided with axial side clearance. Barber-Colman can solve this problem by making the cutter with axial relief in one or both directions so that several cuts can be combined into a single milling operation. These applications show the proper use of axial clearance and helical flutes.



The form on this part has one side which is nearly perpendicular to the axis of the cutter, requiring a cutter with axial relief as well as radial relief. Both the axial and radial relief are formed onto the cutter tooth at the same time, and they are both applied to the complete tooth form. Consequently, the faces of the teeth can be sharpened without changing the tooth form. Helical flutes are provided to produce a shearing cut for improved finish and cutter life.



The form on this cutter is provided with both radial and axial relief because one small section of the form is nearly perpendicular to the cutter axis. Without axial relief, the perpendicular portion of the form would wear rapidly because of insufficient clearance. However, since the entire form has ample clearance behind the cutting edge, cutter life is greatly improved. Helical flutes eliminate any chatter during the cutting operation.



The workpiece in this application is tipped at an angle so that there is no undercut portion in relation to the axis of the cutter. However, in its cutting position, both sides of the form are nearly perpendicular to the cutter axis. The cutter is a two-piece interlocking type with axial relief in one direction on one side of the form, and in the other direction on the other side of the form. As the cutter is sharpened the form spreads apart, but the correct shape of the form is maintained. The proper dimensional relationship between the form is maintained by simply grinding the spacer between the two sections to the proper thickness.

These are only a few examples of the many special cutter problems passing through our Engineering Department daily. We welcome the opportunity to work with you in solving your production problems, and we invite you to send us part prints. Get top cutting efficiency through top cutter design.

BARBER-COLMAN COMPANY

845 ROCK STREET • ROCKFORD, ILLINOIS

Hobs • Cutters • Reamers • Hobbing Machines • Hob Sharpening Machines

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"GRADE MARKED" SHELBY TUBING

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(instead of solid bar stock)
you can produce machined parts
like these at savings up to 50%

Results prove you get better jobs and save plenty by switching to

SHELBY SEAMLESS MECHANICAL TUBING

Precision-fit Guide Pin Bushing. The manufacturer of a wring-fit bushing switched to Shelby Seamless Tubing and produced a harder, stronger, more uniform, longer-lasting and better-fitting bushing.

Used in 100 vital parts. The famous manufacturer of a crawler-tractor makes over 100 parts from Shelby Seamless Tubing to improve the performance and strength of his heavy-duty machine.

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Stainless Steel Shelby Seamless solved wave guide tube problems for manufacturer of Radar Antenna Systems. Eliminated production and plating difficulties previously encountered with carbon steel. Solved corrosion problem . . . met weight and strength factors.

These are just a few of thousands of applications. If you'd like to know how and where you can use this time-and-money-saving seamless tubular steel to improve the parts you make, an inquiry will bring full information.

USS Shelby Seamless tubing is made by master craftsmen by the seamless process. Billets of the finest quality steel are first pierced, then precision-rolled to close tolerances inside and out. Thorough inspections and tests, all along the line, assure you tubing that's as near perfect as it is possible to produce.

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You can make better-quality parts faster and with less cost . . .
you save the wear and tear on tools . . . you save needless waste of steel.

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We stock USS Shelby Seamless Tubing in a complete range of sizes, in different wall thicknesses, various finishes and steel analyses, in all of our 18 warehouses. Your order will be shipped to you in neatly strapped bundles, and each bundle will carry U. S. STEEL SUPPLY'S *exclusive* "GRADE MARK" seal which clearly shows the grade in that particular bundle. Thus, without altering your stocking procedure in any way, you have positive identification of each grade. This new GRADE MARK SERVICE speeds handling, too, and is another reason why it pays to buy from U. S. STEEL SUPPLY.

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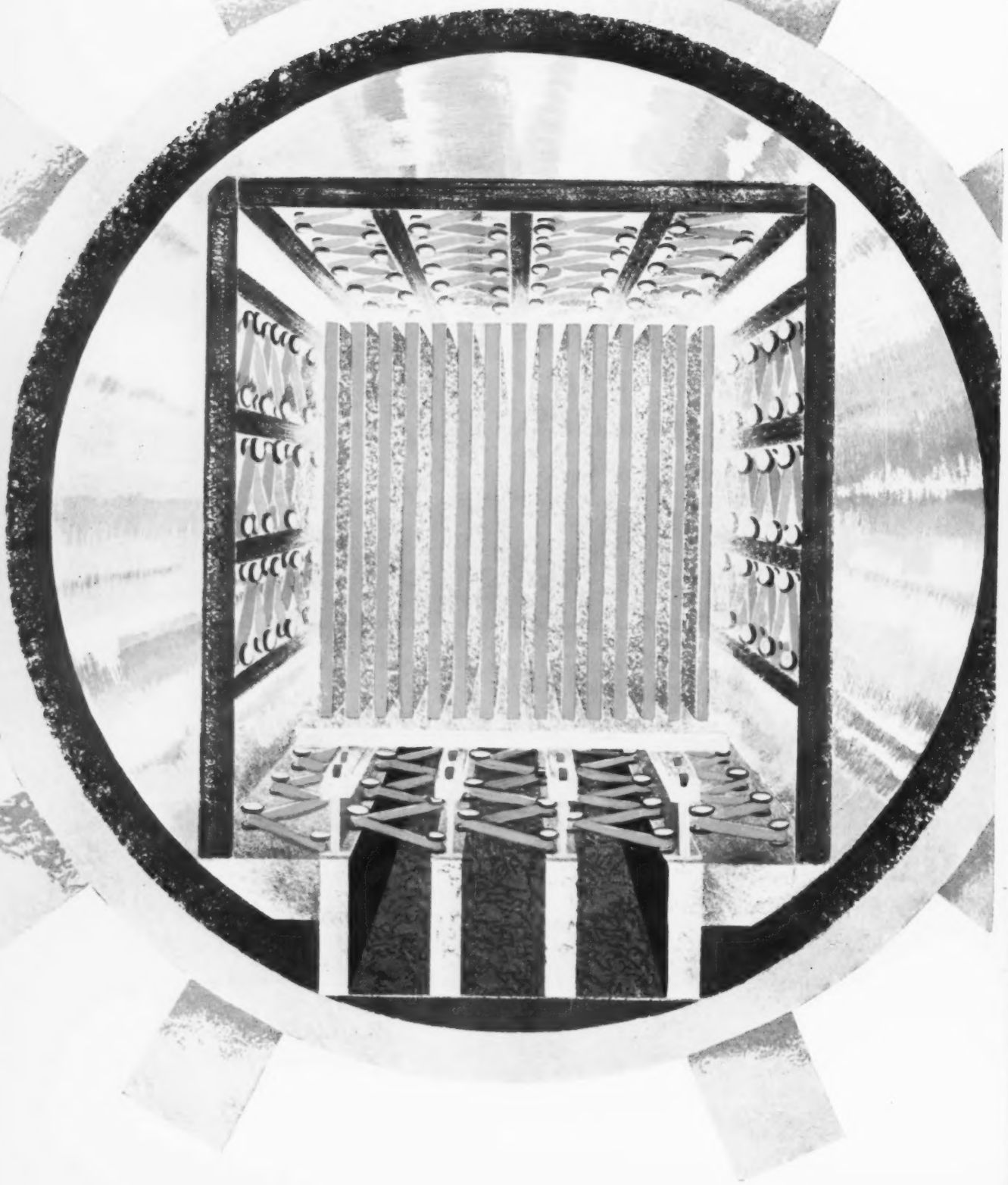
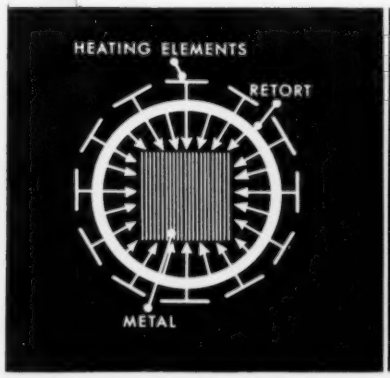


New Westinghouse Kold-Retort furnace speeds vacuum heat-treating of titanium . . . eliminates retort problems

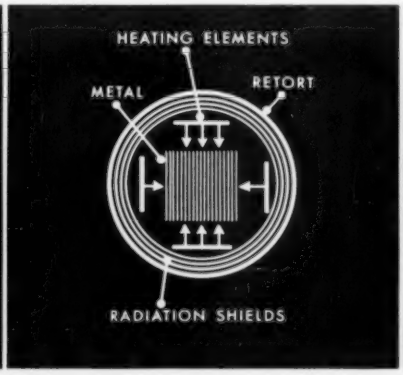
Kold-Retort® furnace design is a bold, original step to increase heating and cooling rates and lower production costs in processing reactive alloys.

It started with setting aside conventional furnace concepts. By co-ordinating vacuum equipment research with design and operating experience at Mallory-Sharon Titanium Corp., Westinghouse engineered more effective heat application.

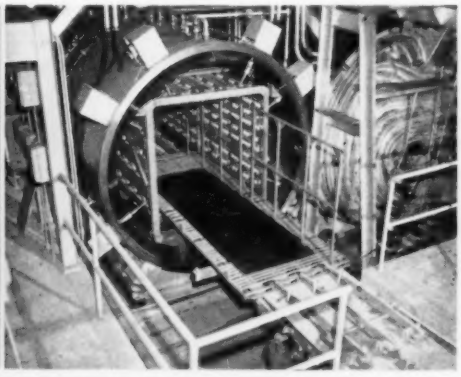
Conventional vacuum furnaces (A-below) depend upon radiation of heat to the retort which then radiates it to the charge. Kold-Retort design (B) places the heating elements inside the retort and uses radiation shields for insulation. Hence, there are no replacement costs for retorts distorted by frequent heating cycles.



A-*Conventional furnace design*



B-*Kold-Retort furnace design*



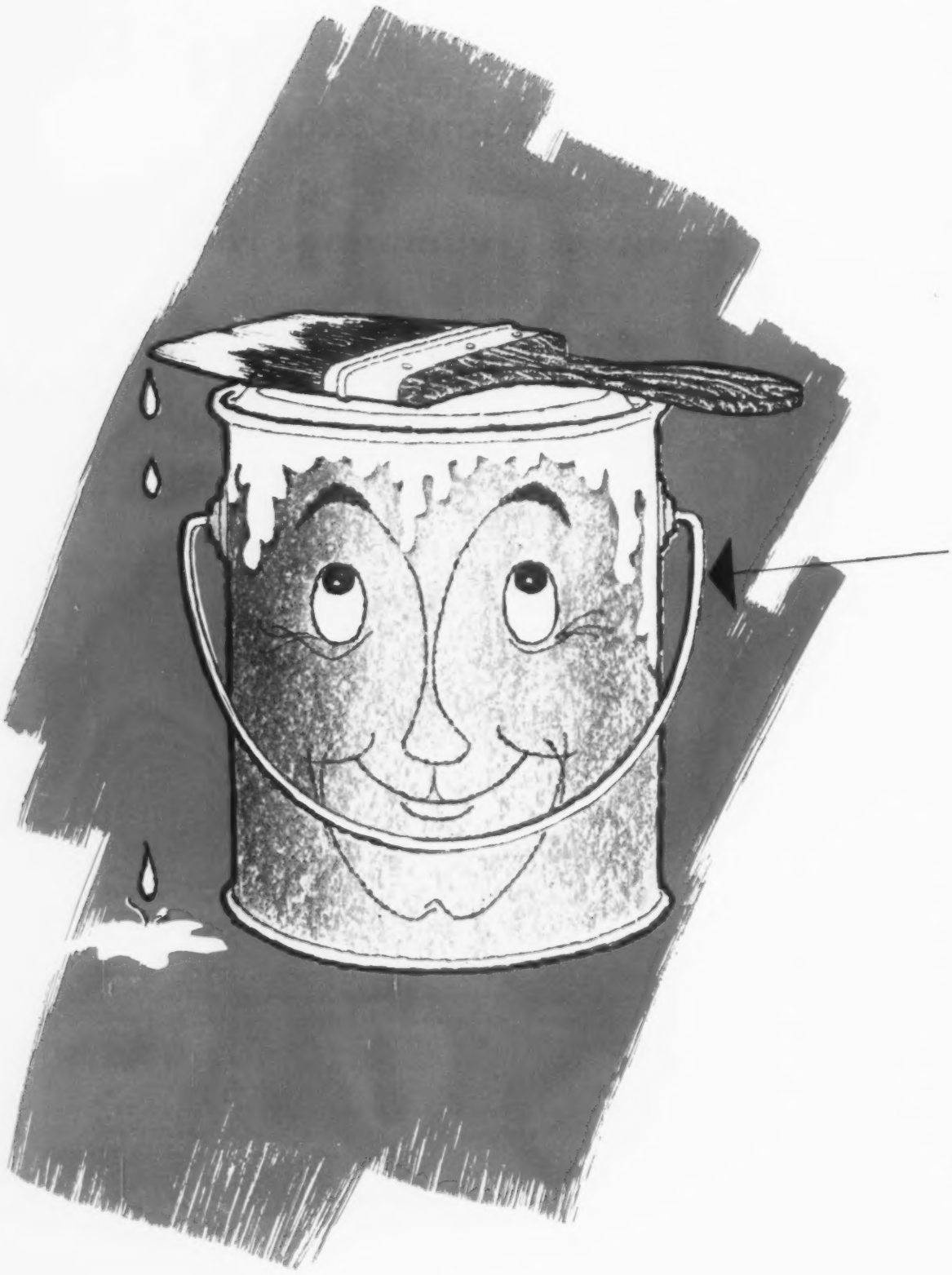
C-*Kold-Retort furnace in operation at Mallory-Sharon Titanium Corp., Niles, O.*

Kold-Retort furnaces (C) have been built with charge capacities up to 4 x 4 x 12′ long and for temperatures up to 3200°F. Because the retort remains cold, there are no size limitations. Preliminary work has already been done on a unit 20 x 12 x 50′ long for brazing complete aircraft wings at 2150°F.

This new Westinghouse design can be a practical answer to lower your costs in vacuum annealing and degassing of titanium and zirconium alloys, bright annealing of stainless steels, and in high-temperature brazing of intricate structures. It's another example of the way Westinghouse helps you Power-Up . . . to get better production and profit from your electrical dollar. Write Westinghouse Electric Corporation, Industrial Heating Division, Meadville, Pa.

J-10467

YOU CAN BE SURE...IF IT'S Westinghouse



Painting is easier with a bucket which has a dependable, easy-to-use handle made from low carbon, hard drawn CF&I-Wickwire Pail Bail Wire.

Chances are you don't need pail bail wire to make paint bucket handles. But *you may need one or more of the nearly 100 different categories of specialty wire for which CF&I-Wickwire is famous.* Let us show you how we can meet your most rigid chemical and physical specifications on high and low carbon wire in all sizes, shapes, tempers, finishes and grades.

the painter's helper

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Curtain Spring Wire
Die Spring Wire
Gutter Broom Wire
Lock Spring Steel
Rake Tine Steel
Regulator Spring Wire
Snake Fishing Steel
Stapling Wire for Preformed Staples (Flat)

LOW CARBON FINE AND SPECIALTY WIRE
Bee Wire
Bonnet Wire
Bookbinder Wire
Broom Wire
Clip Wire
Dent Spacer Wire
Drapery Pin Wire
Florist Wire
Fuse Wire
Glass Netting Wire
Hairpin Wire
Hook and Eye Wire
Mattress Wire
Picture Cord Wire
Picker Tooth Wire
Pin Ticket Wire
Pin Wire
Ring Traveller Wire
Spiral Binding Wire
Stapling Wire
Stapling Wire for Preformed Staples
Stone Wire
Weaving Wire
Weaving Wire for Fly Screen Cloth
Wissco Iron Wire

HIGH CARBON FINE AND SPECIALTY WIRE
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Armor Wire
Belt Hook Wire
Bobbin Ring Wire
Brush Wire (Tempered and Untempered)
Brush Wire (High Strain)
Chrome Vanadium Spring Wire
Core Wire (Aluminum Cable Steel Reinforced)
Curtain Spring Wire
Flexible Shaft Wire
"Gamma" Spring Wire (Upholstery Spring Wire)
Zig Zag Wire
No-Sag Wire
Hat Wire
Heddle Wire
Hose Reinforcement Wire
Hose Wire, Mechanical
Hose Wire, Vacuum and Defroster
Rope Wire
Signal Corps Wire
Spoke Wire
Hard Drawn Spring Wire
Oil Tempered Wire
Spheroidized or Annealed Spring Wire
Tire Bead Wire
Valve Spring Wire

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Case Hardened Ball Wire
Chain Wire
Clamp Wire
Clothes Pin Wire
Concrete Wall Reinforcement Wire
Garment Hanger Wire
Hay Baling Wire (Coiled)
Lingo Wire
Lintel Wire
Loop Wire
Merchant Quality Wire
Pail Bail Wire
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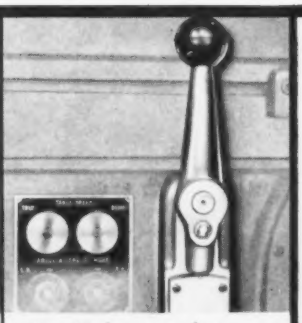
Profits in easy reach....

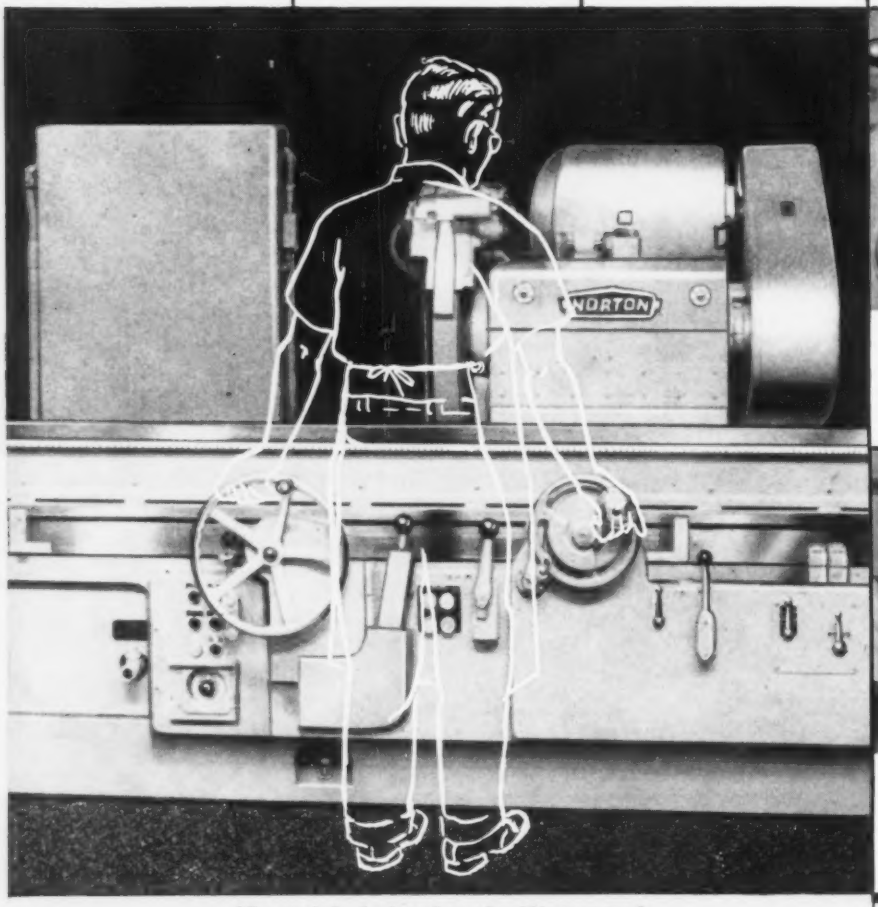
Flip this switch to set work rotation and coolant flow for manual operation or automatic operation with the cycle.

Use this lever to jog work rotation for roundness inspection or unloading.

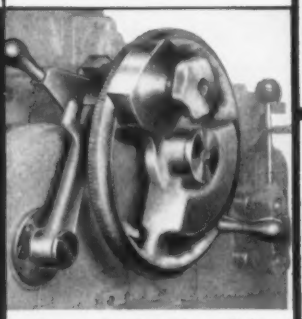
Turn these knobs to set separate dwell controls for each end of table travel.



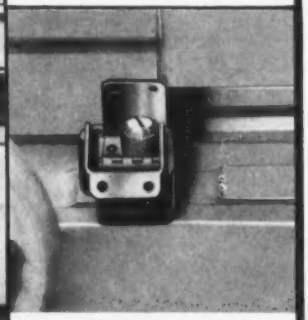
Use this lever to select preset table-truing or grinding speed — eliminating need for continual re-settings.



All controls for feeds and speeds within easy reach.



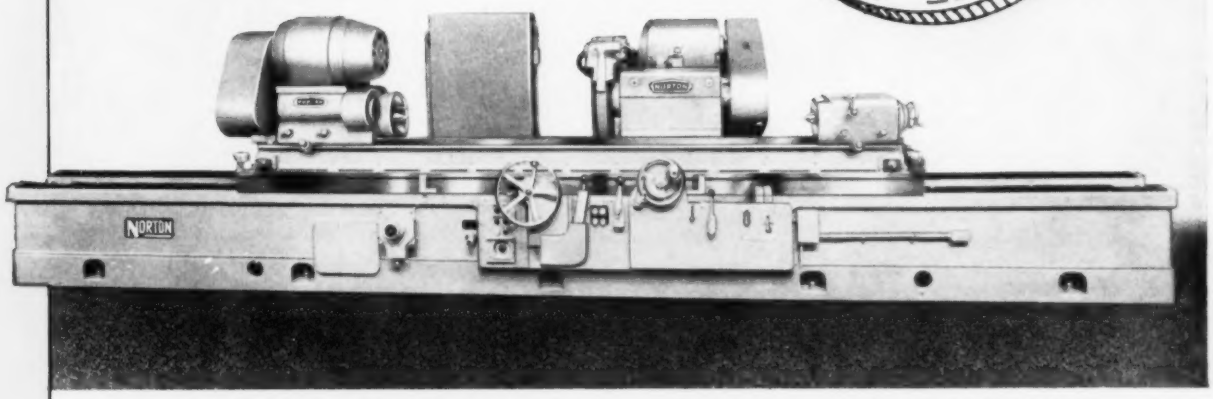
Count the indexing clicks on this wheel-feed handwheel for work diameter reduction in increments as fine as .0001".



Use this simple control for adjusting automatic feed from zero to .003". Total automatic feed is .150" on diameter, with automatic reset after grinding to size.

with two new advanced design Norton Cylindrical Grinders

Cut waste motion



The Norton 14″ x 96″ Type C-2 Semiautomatic Cylindrical Grinder — one of two sizes of new cylindrical grinders just announced by Norton.

The other is the 18″ Type LC-2. Work length capacities of 36″, 48″, 72″, 96″, 120″, 144″ and 168″ are available.

Feed and Speed Adjustments all on front of 14″ Type C-2 and 18″ Type LC-2 Grinders . . . Key Maintenance Points Easily Accessible

Features on these two new Norton cylindrical grinders mean more profit because they eliminate waste motion.

Operators of the 14″ Type C-2 and 18″ Type LC-2 need never leave their normal positions to make changes in settings. Controls are all at their fingertips.

All equipment needing occasional inspection is in easy reach. Electrical controls are grouped in an elevated enclosure. Motors, pumps, filters, pressure relief valves, and ways lubricant valves are all mounted on the outside for inspection or service.

The machines incorporate the proved Norton wheel spindle design, positively controlled micrometer-fine wheel feed design and generous, rugged overall construction to insure highest productive capacity and unsurpassed sizing control. They assure lowest costs in producing highest quality parts.

These features and many more give you the "Touch of Gold", by making your grinding more profitable. And only Norton can bring you the long experience with both grinding machines and wheels that is engineered into these advanced machines.

Ask Your Norton Representative

for more facts about the new 14″ Type C-2 and the 18″ Type LC-2 cylindrical grinders. Or write direct to NORTON COMPANY, Machine Division, Worcester 6, Mass. *In Canada:* J. H. Ryder Machinery Co., Ltd., Toronto 5.

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Behr-Manning Products: Coated Abrasives • Sharpening Stones • Behr-cat Tapes

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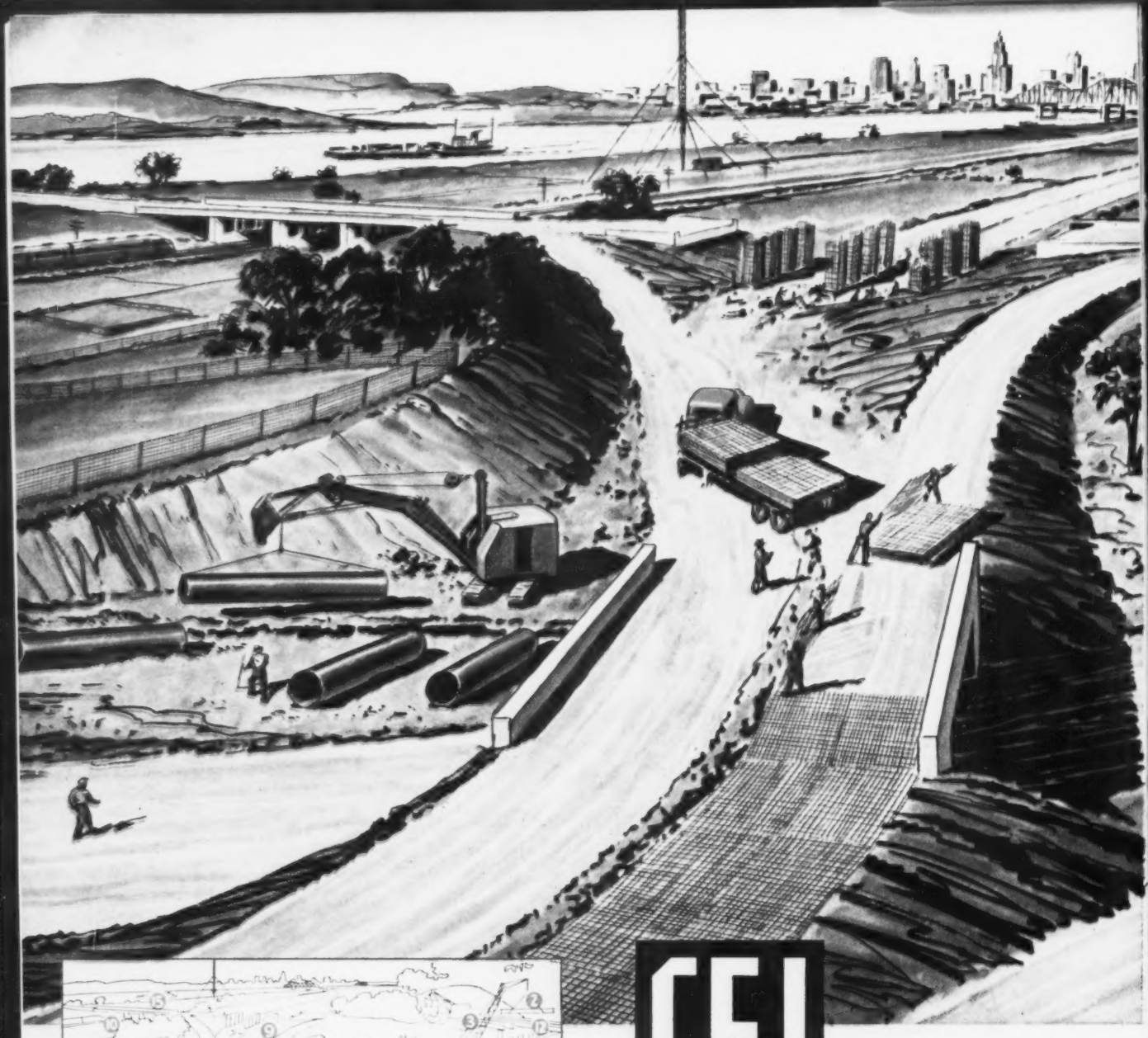

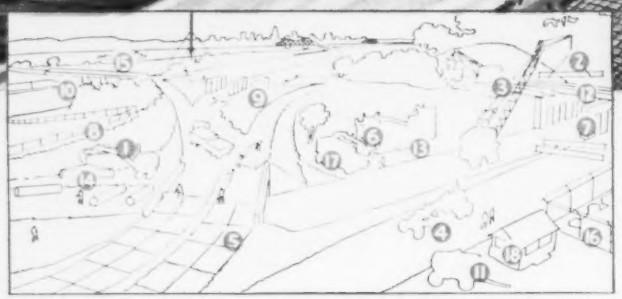

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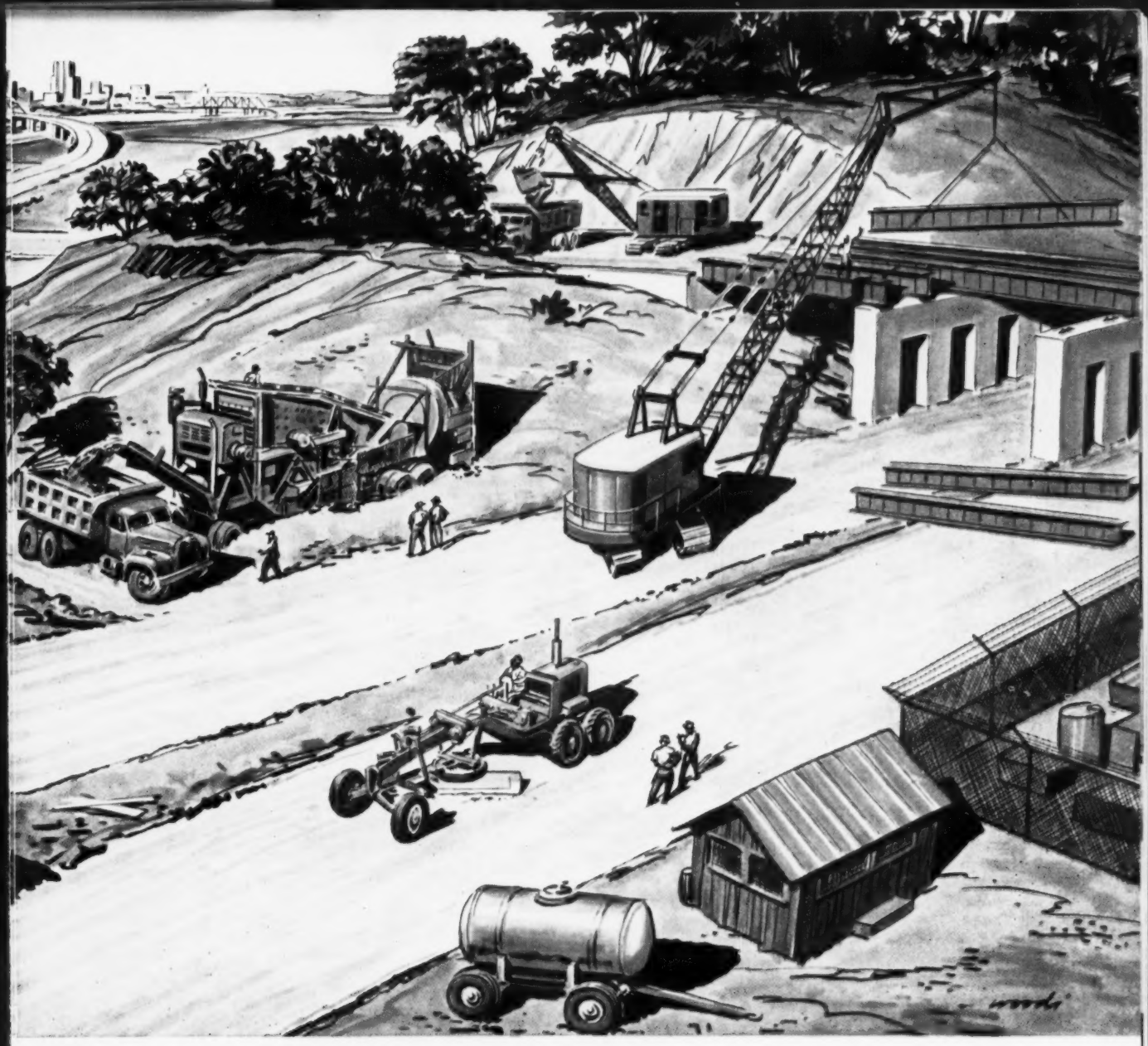
14. Claymont Large Diameter Pipe
15. Claymont Alloy Steel Plates
16. Realock Chain Link Fence
17. Wickwire Springs
18. Gold Strand Insect Wire Screening



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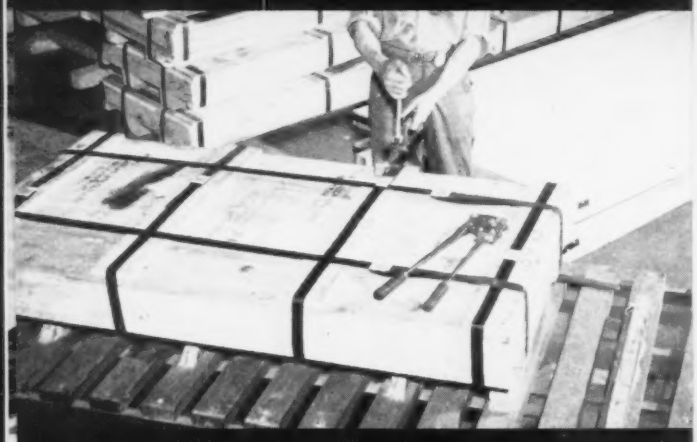
STEEL STRAPPING unitizes and braces aluminum ingots for carload shipping. *(Idea No. U1-4)*



STEEL STRAPPING reinforces packages of stainless steel sheets for export shipment. *(Idea No. U6-11)*

STEEL STRAPPING braces cast iron pipe for safe, secure movement by motor truck. *(Idea No. U5-1)*

AIM* for speed and savings

Product protection through Acme Idea packaging can bring you the important benefits of safe, secure packs with increased speed and labor-material economies. Throughout the entire scope of industry Acme Steel Ideas, procedures, tools and materials are speeding and protecting products from production line to end-user. You owe it to yourself to learn how.

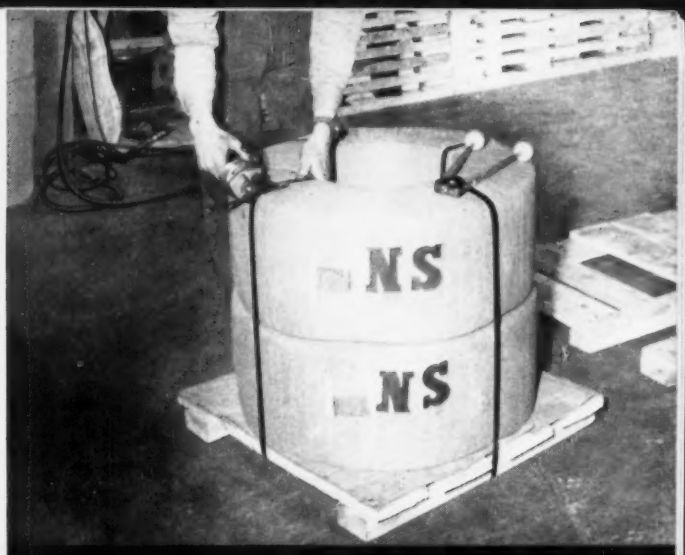
A product protection-wise Acme Idea Man is located near your plant. He is immediately available to discuss your packaging problems and provide you with hundreds of in-use Acme Steel Strapping ideas for better packaging and shipping. The seven ideas shown on these pages are included in the Ideas-In-Action Report files your Acme Idea Man will be pleased to show you. Among the many Ideas-In-Action Reports Acme Steel has developed from the experiences of dozens of industries are sure to be applications that can be applied to your particular operations with important time and dollar benefits to you.

An Acme Idea Man is ready to offer you Ideas-In-Action, plus his training, experience and steel strapping know-how without cost or obligation in any form.

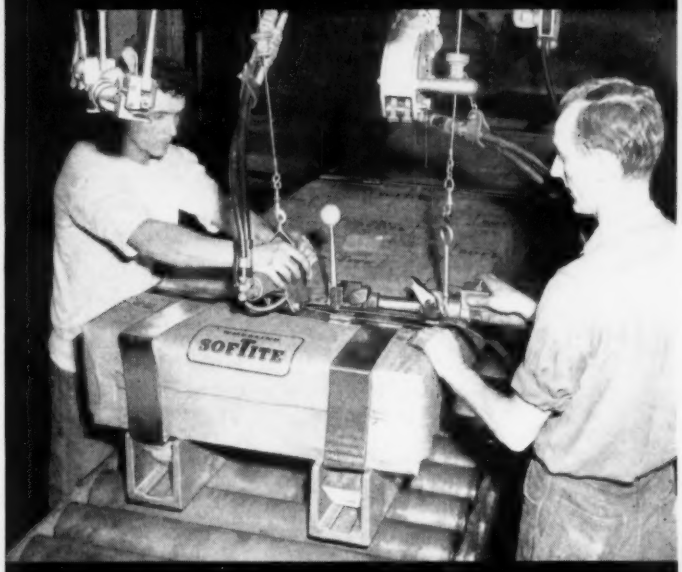
Your *Acme Idea Man can be contacted at the nearest Acme Steel office. Look under "Steel Strapping" in your classified directory, or send the coupon for full information.

ACME STEEL **STEEL STRAPPING**

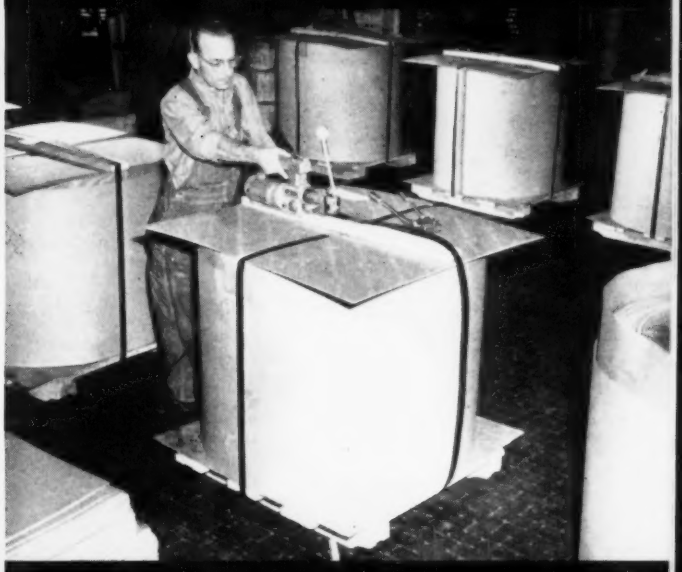
STEEL STRAPPING unitizes zinc slabs for fast, economical, mechanized handling. *(Idea No. U6-3)*



STEEL STRAPPING palletizes coils of tire bead wire for better handling and storage. *(Idea No. S4-4)*



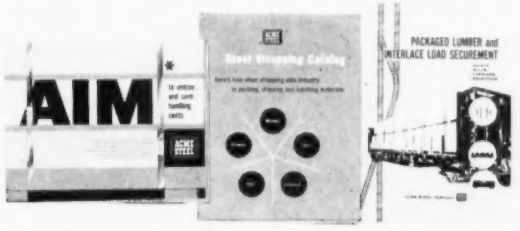
STEEL STRAPPING applied with hydraulic tools speeds sheet steel packaging. *(Idea No. U6-5)*



STEEL STRAPPING skid-loads coils of aluminum for safe, easier handling. *(Idea No. U6-10)*

3 IDEA BOOKS

These three information packed Acme Steel Idea Books are available to you on request. They will provide dozens of clues to better ways to package and protect your products and plant output.



Write today for your choice of the above three Acme Steel Idea Books. Merely indicate the books you want on the coupon at the right and mail. Your request will be filled promptly, with no obligation.

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Please send me the new Acme Steel Idea Books I have checked below:

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- ☐ Unitizing Catalog
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- ☐ Have an Acme Idea Man call.

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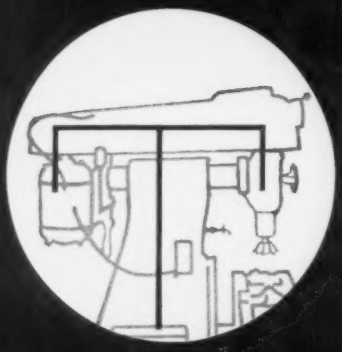
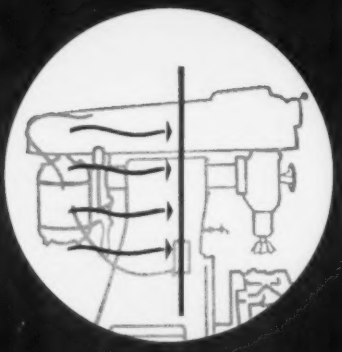
BALANCED RIGIDITY



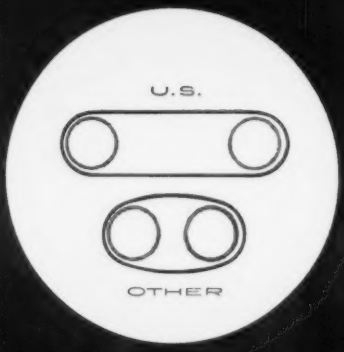
Motor mounted behind column balances weight of head, minimizes deflection.

ISOLATION OF MOTOR VIBRATION

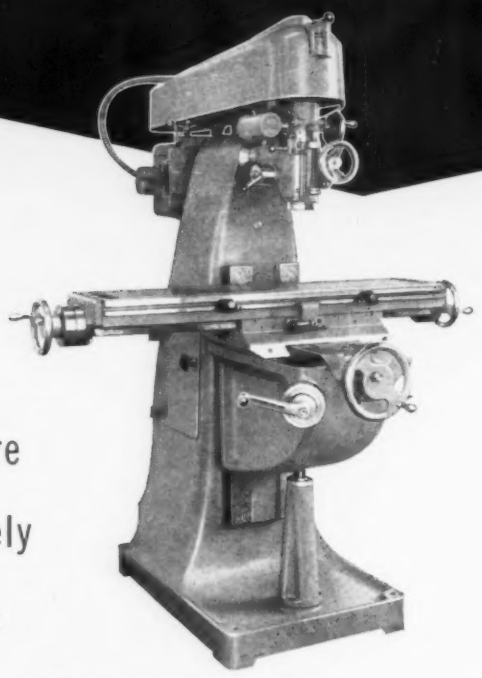


Column acts as baffle, keeping motor vibration away from head.

MORE EFFICIENT POWER TRANSMISSION



Wide belt spacing permits use of B-section V-belt, more wrap-around on pulleys.



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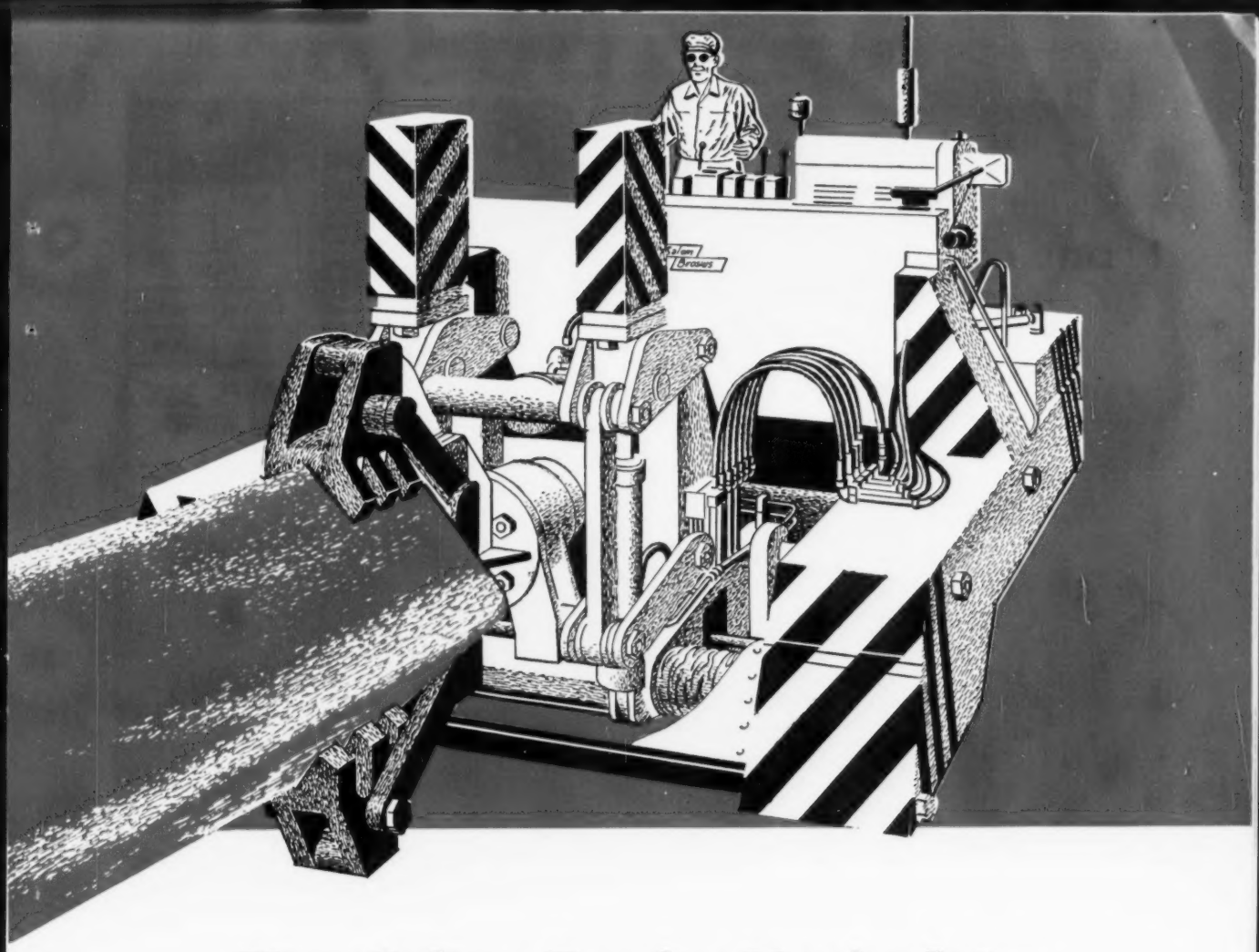

New Salem-Brosius Manipulator

adds speed, safety and economy to heavy forging

This completely new Salem-Brosius all-hydraulic Auto-Floor Manipulator meets the trend of industry toward hammer and press forging of high alloy, stainless, and tool steels, and the many new extremely hard refractory-type alloys. The forging of these metals necessitates manipulating equipment of extreme ruggedness and durability.

This new machine, with its greater mass, new shock absorbing principles, heavier construction, and a new and superior hydraulic system, offers long, trouble-free service, low-cost maintenance, and increased finished forging production.

At hammer or press it raises, lowers, tilts, rotates or laterally moves the hot stock, satisfying handling requirements. Also, it can charge or draw forge shop furnaces, and operate with the facility of a fork-lift truck in billet handling. Call for a visit from a Salem-Brosius forging expert to show you how you can benefit from the use of this manipulator. There is no obligation.

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Pinion	Gear		Pinion	Gear
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5"		Center Distance	6.25"	
1 lb. 3 oz.	9 lb. 1 oz.	Weight	2 lb. 3 oz.	13 lb. 2 oz.
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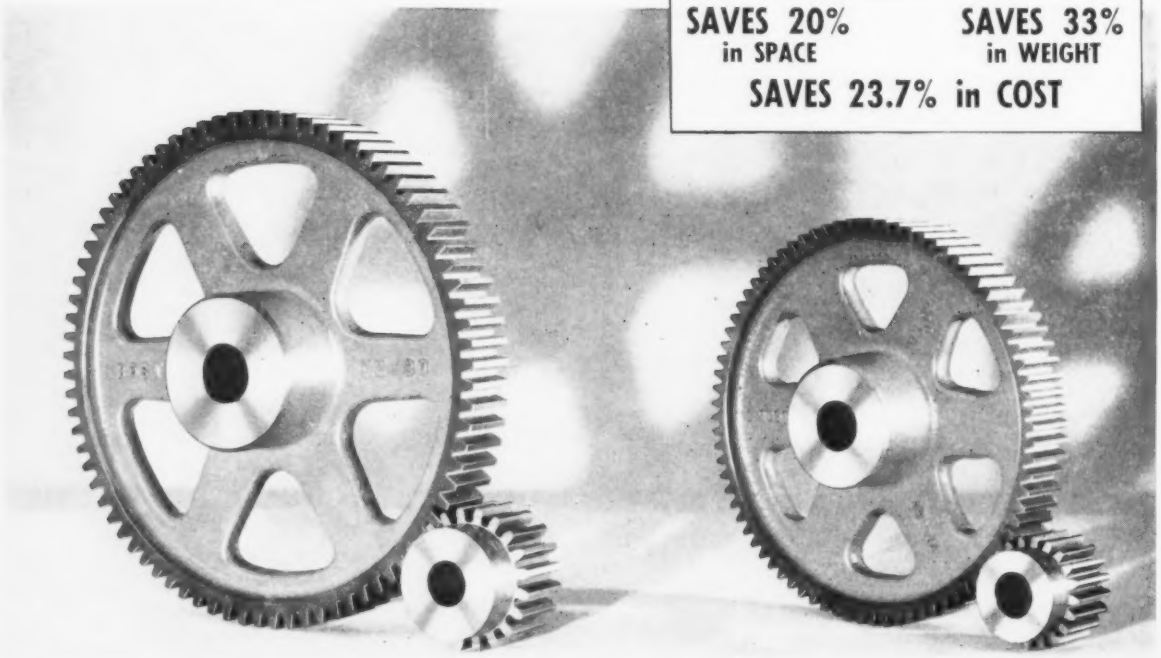

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Fine Pitch Brass
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and 24 P.

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Fine Pitch Brass
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and 24 P.

SEE CATALOG No. 56 for complete listings

Every engineer knows the quiet-running efficiency and high strength of the 20° Pressure Angle tooth form. For most installations, the 20° P. A. Gear that meets specifications saves an average of 20% in space, weight, and cost over the comparable 14½° P. A. Gear required.

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Linkage is heavy steel for true piston alignment!

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Follower rod disappears after filling—for ease of handling!

Heavy-duty Lever Gun
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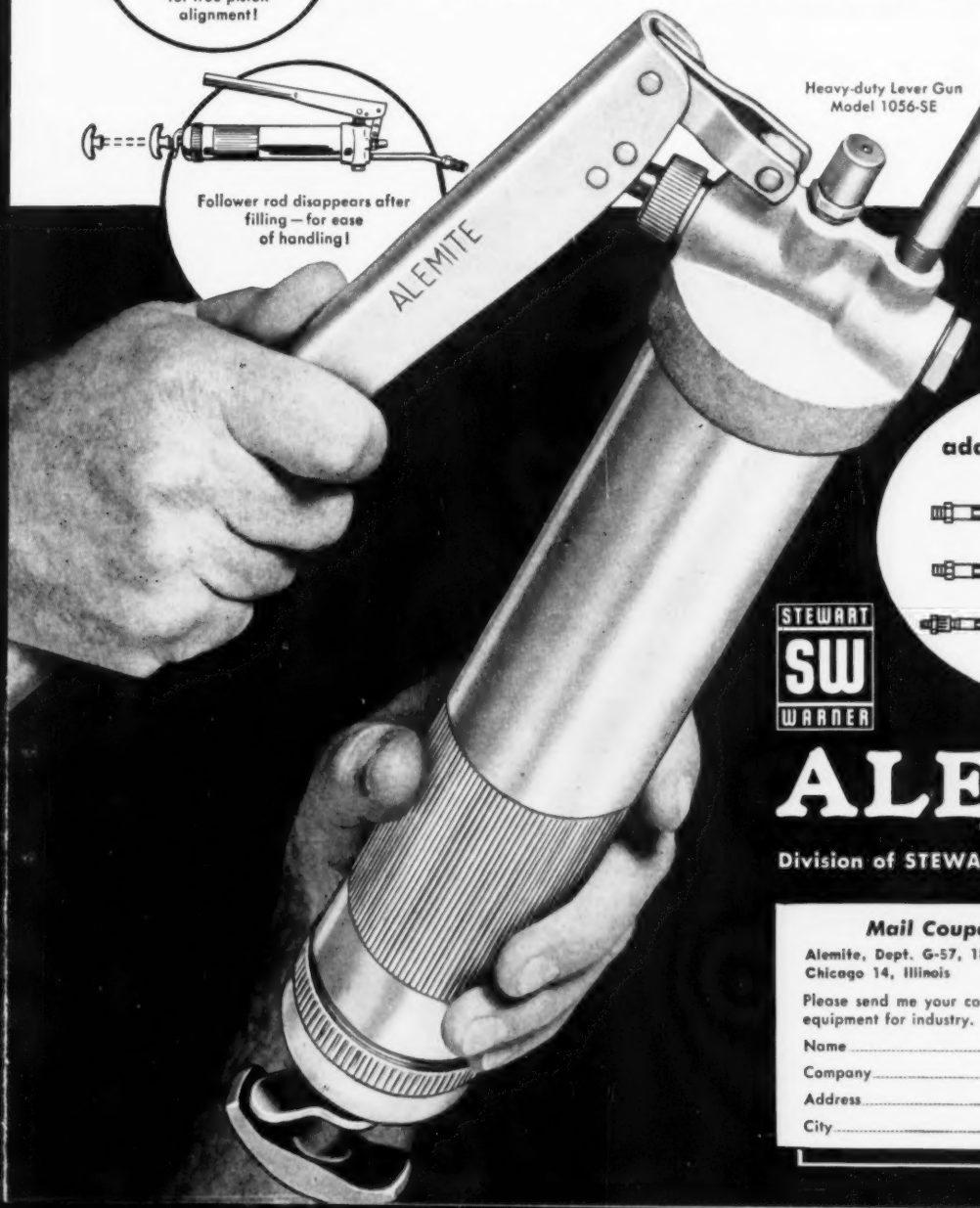
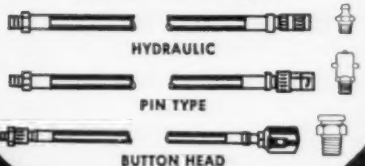
Loader fitting for fast clean filling with loader pump. No mess—no waste—no air pockets!



Complete line of adapters and hose for all types of fittings!



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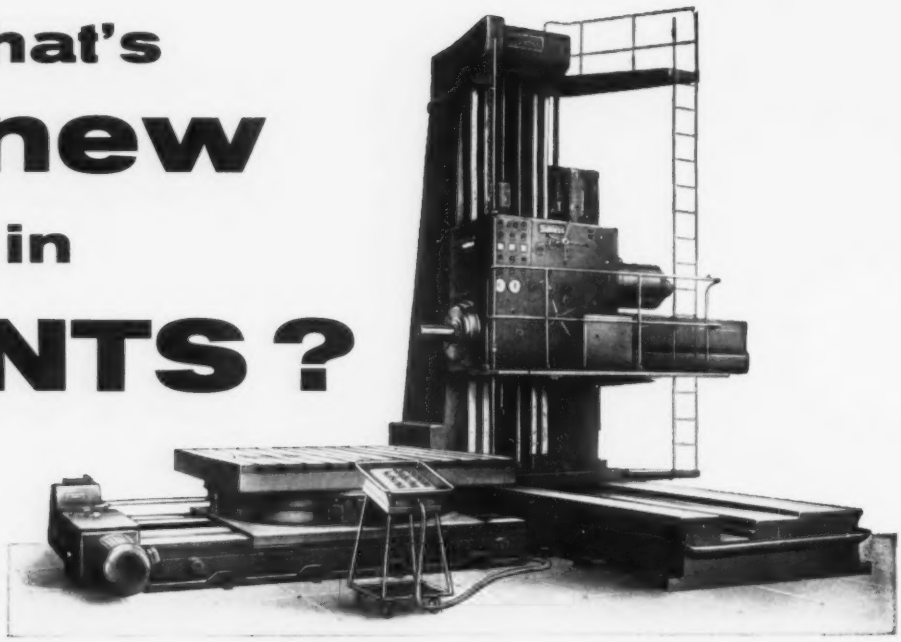
what's new in GIANTS?



This 8⅞" SCHIESS model BF horizontal boring and milling machine . . . Now completely redesigned with many innovations. Here are a few . . .

Two individual drives—gear-drive for roughing, belt-drive for finishing. Belt-drive particularly suited to high-speed machining with carbide tools. New tool clamping device—does away with draw keys, hammers, drifts and binding screws. All spindle-slide movements controlled from easily accessible operating platform (or from pendant station or portable control panel, if desired). Special main-drive belt requires no readjusting. Column, spindle-slide and boring spindle may be adjusted at rapid traverse.

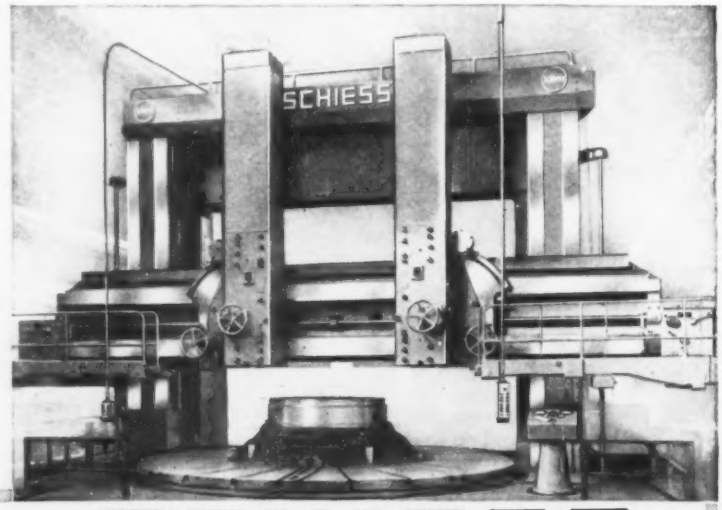
Spindle diameters, $6\frac{5}{16}$" to $8\frac{7}{8}$". Maximum diameter bored, 59"—faced, 79".

It takes Europe's largest builder of heavy machine tools, Schiess, to turn out giants like these. Parts and service as close as Pittsburgh. And an American Schiess engineer will be happy to help you size up these heavy producers for your heavy production needs. Write for catalogs and complete specifications on all Schiess BF and K models.

This 23 ft. SCHIESS model K vertical boring mill . . .

Look at all these new features—each one a time-saver! Rapid traverse motions with pushbutton control of changeover from feed motion to independent power traverse. Electro-mechanical locking of cross-rail to columns. Fingertip speed control—counterbalanced cross-rail and side-head—completely enclosed swiveling octagon rams—pendant control—automatic lubrication.

Turning diameters in standard sizes range from 8 ft. to 23 ft. (which can handle stock up to 100 tons!). Basic Schiess designs permit extra heavy machines, normally considered specials, to be built to your work diameter and load requirements. Even a diameter of 84 ft.!



SCHIESS

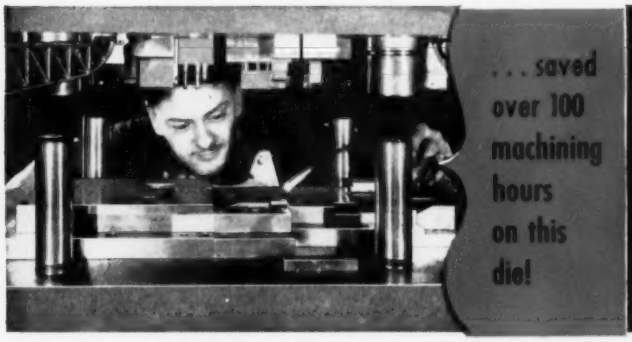
engineering division

AMERICAN SCHIESS CORPORATION

1232 Penn Avenue, Pittsburgh 22, Pa.

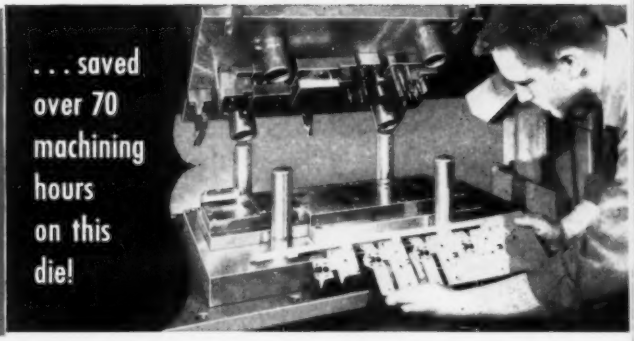
Using "free machining" Olympic FM (D-2 type) die steel...

Middlestadt Machine Co., Baltimore, Md.



. . . saved over 100 machining hours on this die!

Six station progressive die

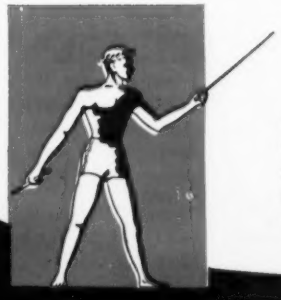


. . . saved over 70 machining hours on this die!

Five station progressive die

In the manufacture of these long-run dies, used to produce brackets for hanging venetian blinds, the Middlestadt Machine Co. reported a savings of 15% in the machining times. This savings, attributed to the "free-machining" characteristics of Olympic FM, was important because the total machining time approximated 1125 hours.

In addition to these savings, Middlestadt, one of the largest precision die shops in the mid-East, also noted these additional advantages of Olympic FM: (1) full uniformity in the steel; (2) excellent non-deforming characteristics during heat treatment; (3) large range of stock sizes available for fast delivery.



Use Olympic FM high carbon-high chromium die steel *for long run dies...*

. . . and you, too, can effect savings in machining time while gaining outstanding performance advantages. These plus factors are a direct result of Latrobe's exclusive DESEGATIZED® process of manufacture where the carbide particles and alloy sulphides are uniformly dispersed throughout the steel.

Over 250 sizes of Olympic FM are readily available from ten conveniently located warehouses . . . Call your Latrobe representative today!

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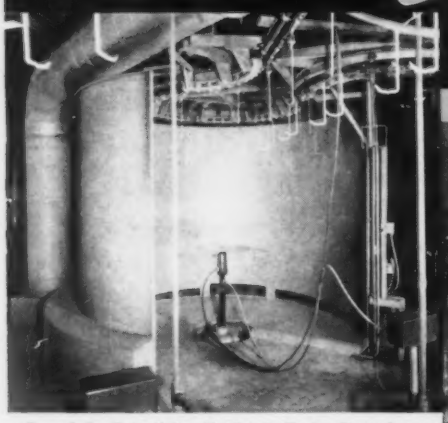
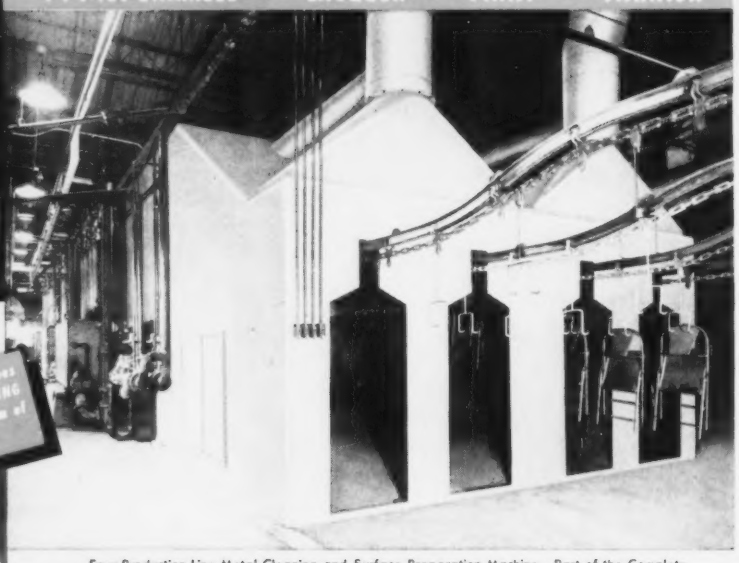
COMPLETE *Finishing* SYSTEMS

. . . for ENAMELS • LACQUER • PAINT • VARNISH

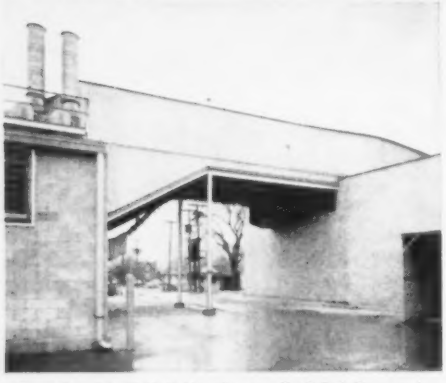


One of the Eight Mahon Ventilated, Circular Electro-Spray Enclosures Employed in the Four Separate Painting Facilities in this System. Note Provisions for Control of Air Movement.



Four-Production-Line Metal Cleaning and Surface Preparation Machine—Part of the Complete Mahon Finishing System in the Durham Manufacturing Corporation's Plant, Muncie, Indiana.

One of the Four Separate Painting Units in this System. Each of the Four Production Lines Passes through an Identical Arrangement —Two Electro-Spray Enclosures and Staggered Touch-up Booth.



Ramp-Tunnel to Finish Baking Oven on Roof. Both Ramp and Oven Accommodate Four Parallel Conveyor Lines in One Straight-through Pass. Equipment is Divided with Two Lines on Each Side. Either Side can be Operated Independently.

Complete NEW FINISHING SYSTEM Provides FLEXIBILITY and Greatly Increased PEAK PRODUCTION CAPACITY!

A new and highly efficient Mahon Finishing System at Durham Manufacturing Corporation, Muncie, Indiana, gives management needed flexibility and greatly increased maximum painting production capacity. Four parallel painting production lines pass through the entire system. The Metal Cleaning and Surface Preparation Equipment, Dry-Off Oven, Cooling Tunnel and Finish Baking Oven are designed to accommodate four parallel conveyor lines. Each of the four conveyor production lines passes through one of four separate painting equipment arrangements—each of which includes two circular electro-spray enclosures and a staggered, touch-up Spray Booth. The entire System is designed so that two of the painting production lines can be shut down—the processing equipment is divided for this purpose. An ultramodern Finishing System of this type provides a manufacturer like Durham with painting equipment which will meet peak production demands and still permit operation at 50% capacity with the same efficiency and economy. If you are contemplating new finishing equipment, you, too, will want to discuss methods, equipment requirements and possible production layouts with Mahon engineers . . . you'll find them better qualified to advise you, and better qualified to do the all-important planning, engineering and coordinating of equipment. See Sweet's Plant Engineering File for information, or write for Catalogue A-657.

THE R. C. MAHON COMPANY • Detroit 34, Michigan

SALES-ENGINEERING OFFICES in DETROIT, NEW YORK and CHICAGO

Engineers and Manufacturers of Complete Finishing Systems—including Metal Cleaning, Pickling and Rust Proofing Equipment, Hydro-Filter Spray Booths, Dip and Flow Coaters, Filtered Air Supply Systems, Drying and Baking Ovens, Cooling Tunnels, Heat Treating and Quenching Equipment for Aluminum and Magnesium, and other Units of Special Production Equipment.

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ALCO presses turn out open-die forgings to 30,000 lb; same ALCO steel, same high quality as ALCO circular forgings

Recently, at Latrobe, Pa., ALCO began production of open-die forgings for industry. They include rolls, pinions, shafts and others. Available to 40 ft in length and 30,000 lb in weight, they incorporate the same steel, are made with the same quality control, as ALCO circular forgings.

You save money with ALCO quality, leadership. Each forging is carefully controlled from open hearth to machining. If you do extensive machining on a forging, Hi-Qua-Led Steel®, which only ALCO offers, can cut your machining costs up to 50 per cent.

Buy the best forgings. ALCO now makes both circular and open-die types. For more information contact your nearest ALCO sales office, or write Spring & Forge Division, Dept. OCF-5, P. O. Box 1065, Schenectady 1, N. Y.

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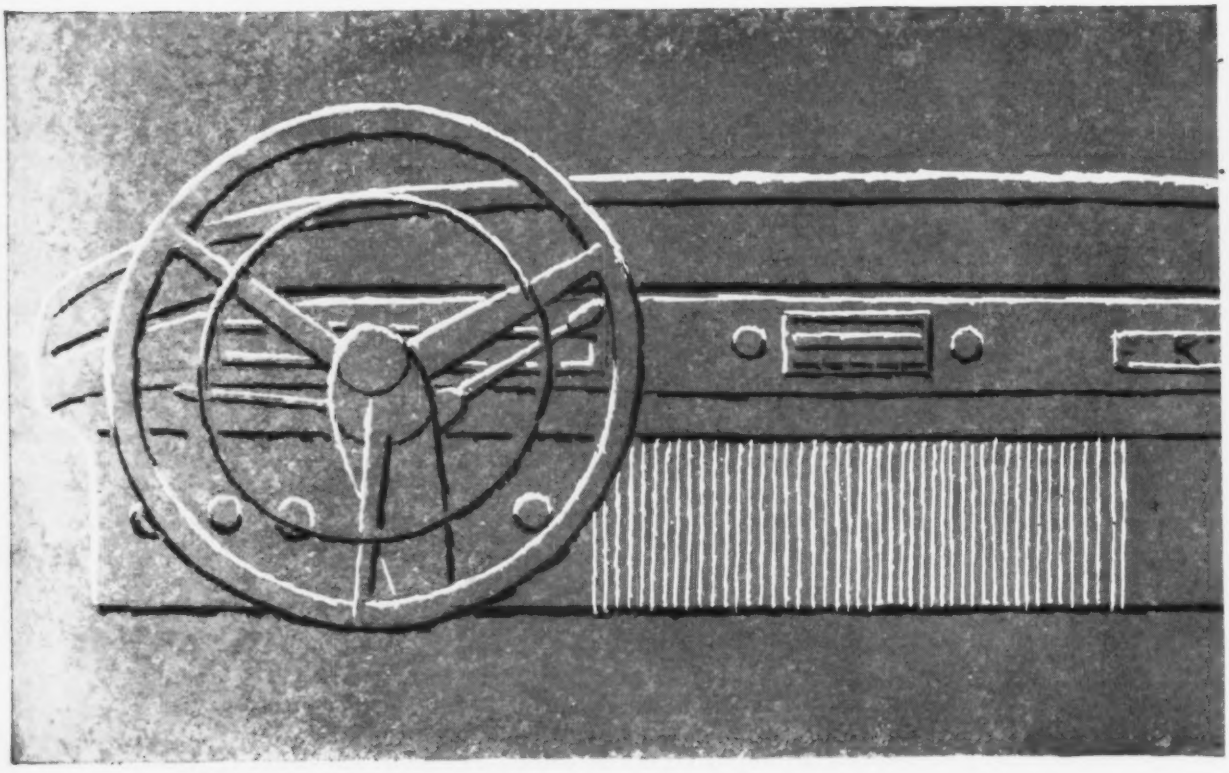
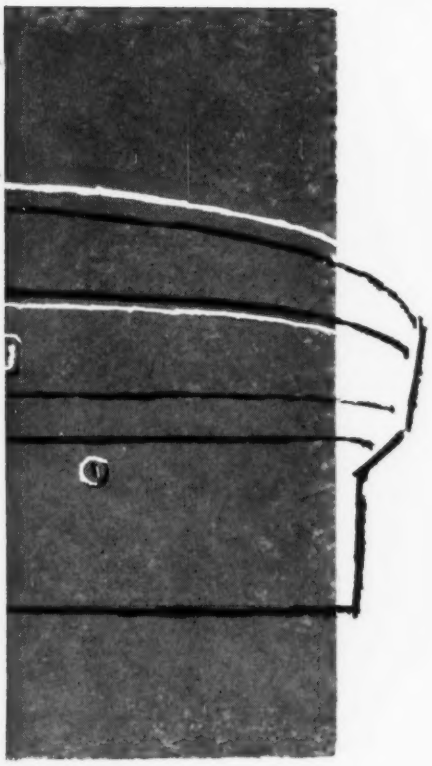


UNITED STATES

USS

that can't fall off, rub off, or chip off!

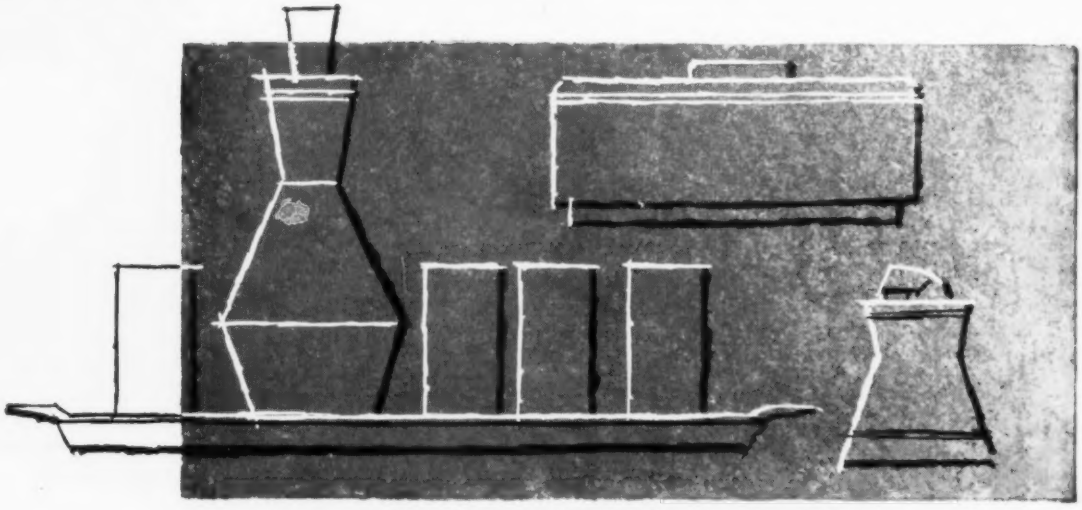


EMBOSSED STRIP STEEL

Embossed strip steel—with the pattern built right in the steel—is an exciting and salable way to decorate products of steel. It is a way to add durable texture to an automobile dashboard, distinctive pattern and design to an automatic toaster. It is a way to add permanent charm and character to hinges, escutcheons, or other hardware items.

It is the low-cost way to dress up a product, because you don't have to apply the pattern. It is right in the raw material, put in at the steel mill. And put in to stay.

Tailored to your product! Amerstrip steel—either embossed or plain—is always tailored to a specific use. You get the exact shape, finish, ductility and other characteristics that you need. As a result—you can often build a better product, more economically, by making it from Amerstrip.



Call any sales office of American Steel & Wire for more information about the availability and uses of Amerstrip in carbon, alloy, or stainless grades.

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S T E E L

AMERSTRIP

Report on Research and Development at Erie Forge & Steel Corporation

Shaft is rotating during non-destructive sonic test

No Defects In This 75,000 Pound Forging

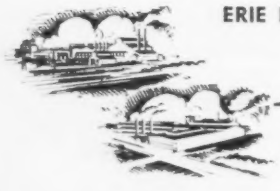
Today's demands by the electrical industry for large rotor forgings free of unsound metal are met at Erie Forge & Steel Corporation by a continuing research, testing and development program.

For example, this 75,000 pound rotor forging is being tested by the Ultrasonic Reflectoscope, a test so sensitive that it will expose structural defects of microscopic size. Even under so rigorous a test, this huge forging showed *no defects*.

Through the years our continuously expanding program of Research and Development, keeping abreast of progress in the metal industry, has resulted in the use of the most modern techniques in the Open Hearth, Forging, Heat Treating and Quality Control Divisions. Under direction of our Metallurgical Department we are producing:

- Cleaner, sound ingots
- Control of phosphorus and sulphur
- Maximum elimination of hydrogen in steel making
- Ingot mould design and solidification characteristics
- New compositions with greater ductility, notch toughness
- Accurate temperature control in melting, forging, treating
- New forging techniques to insure metal soundness
- Improved concepts in testing and evaluating quality

Another example of the advantages of one responsibility and one control.



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MEMBER AMERICAN IRON AND STEEL INSTITUTE

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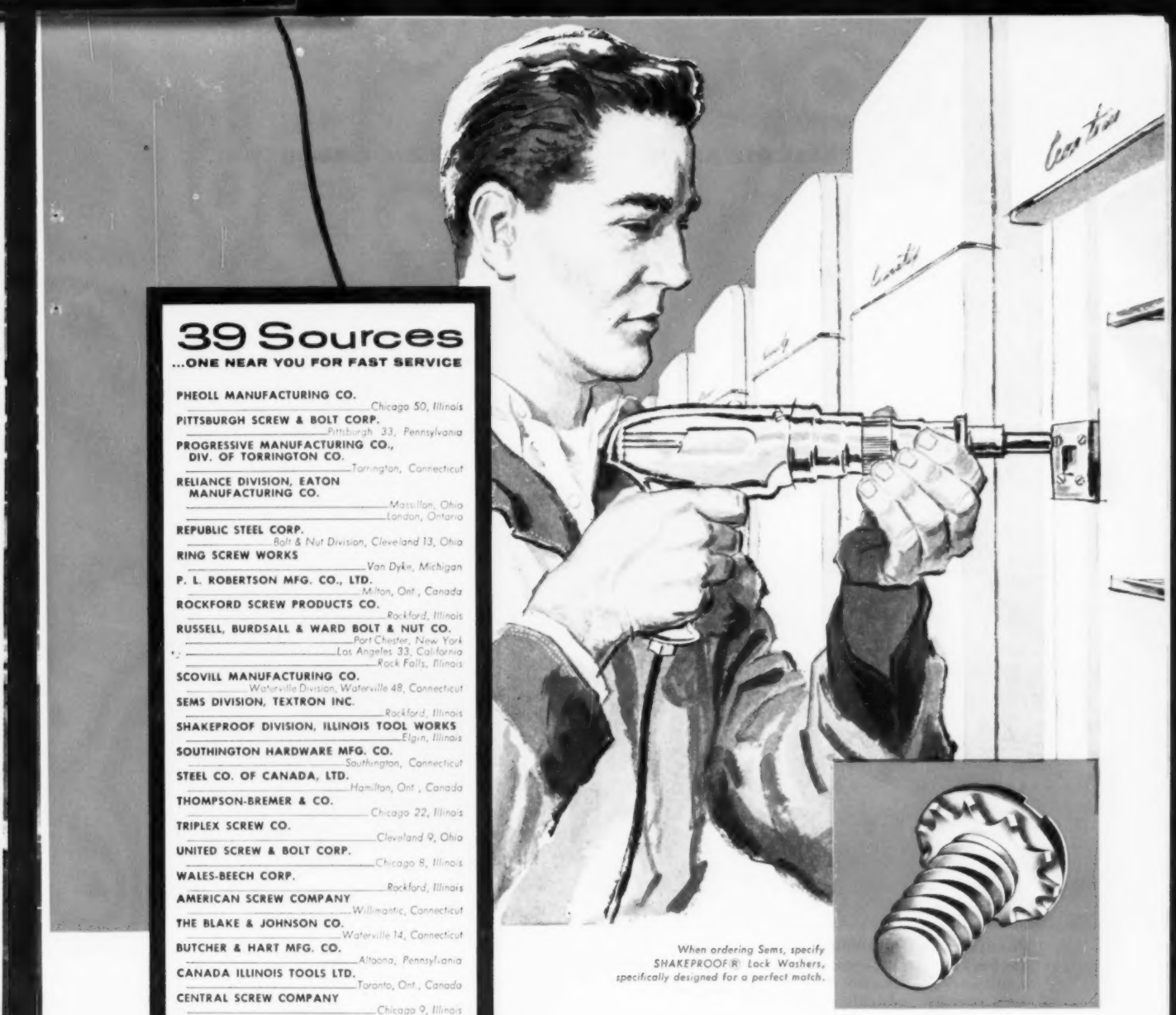

39 Sources

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Clifton, New Jersey

When ordering Sems, specify SHAKEPROOF® Lock Washers, specifically designed for a perfect match.

pre-assembly...

reduces handling...saves time and money

Sems fasteners are pre-assembled to cut wasteful hand operations in mass-assembly production. Washers can't be lost or forgotten and rejects due to mismatched screw and washer are stopped. Often hopper-fed for automatic driving, pre-assembled Sems are a first step in automation.

Sems

SEMS is a development of Illinois Tool Works, Chicago

AMERICAN ORIGINALS IN IRON AND STEEL

The process that was born by accident

Pondering the possibilities of cold rolling one day back in 1860, Bernard Lauth* was observing a millworker snake hot iron bars between swift-turning rolls. Suddenly the worker's tongs were yanked from his hands and pulled through the rumbling mill.

Later on, as the story goes, Lauth recovered the flattened implement and was fascinated by the high luster given to the metal. In later experiments, he discovered that by cold rolling iron bars he achieved greatly improved accuracy, appearance and physical characteristics, including strength.

Thus, it was partly by accident that the cold-rolled process was born . . . the process that today is being so successfully applied to modern steels.

Baker's MAGDOLITE, likewise, was an important early discovery in the annals of iron and steel. And, year by year, continued research has improved this product. Today MAGDOLITE helps you to obtain more ingots and better furnace efficiency at lower refractory cost. Users tell us that Baker's MAGDOLITE is 5 ways better . . . in composition, preparation, strength, economy, and quality.

Don't say dolomite. Save dollars. Specify Baker's MAGDOLITE!

*Bernard Lauth was a partner of B. F. Jones, Sr., founder of Jones & Laughlin Steel Corporation.

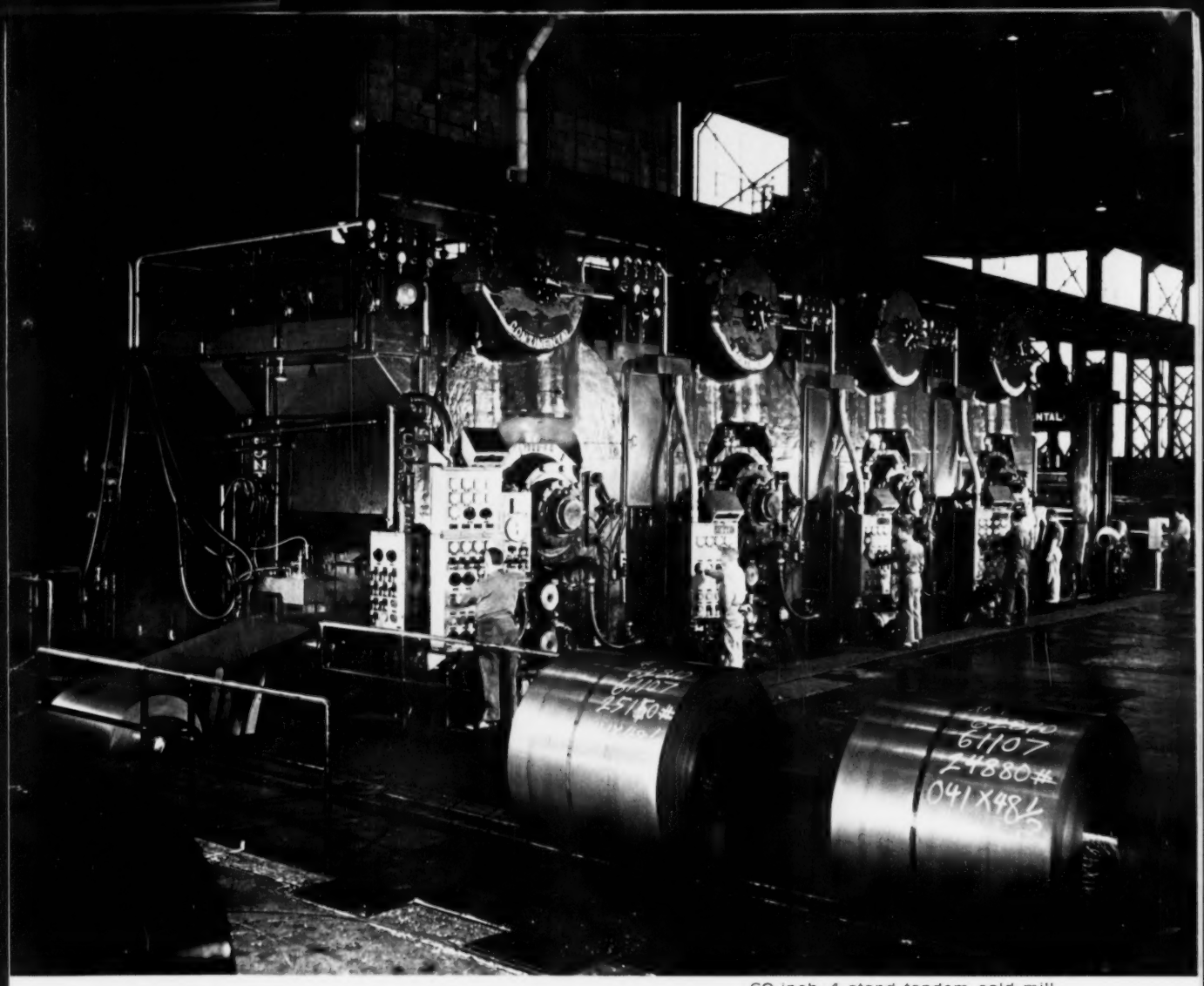
ANOTHER AMERICAN ORIGINAL

JEBCO
PRODUCTS
SINCE 1889

BAKER'S MAGDOLITE
The original dead-burned dolomite

THE J. E. BAKER COMPANY

YORK, PENNSYLVANIA • PLANTS: BILLMEYER, YORK, PENNSYLVANIA • MILLERSVILLE, OHIO



60-inch, 4-stand tandem cold mill

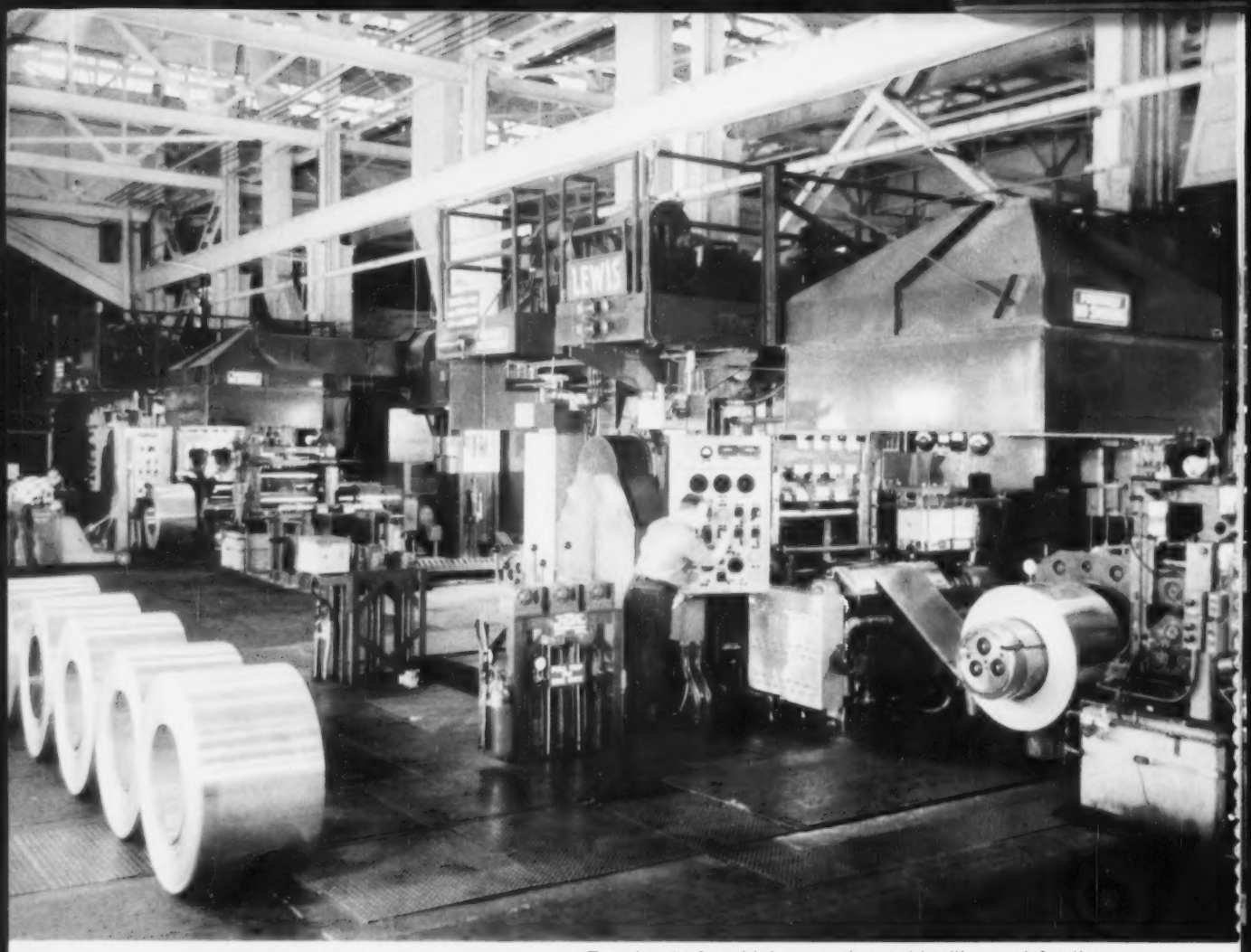
BLAW-KNOX
COLD STRIP MILLS

Blaw-Knox designs and builds all types of cold reduction and temper mills for ferrous and non-ferrous work. Other Blaw-Knox equipment for the metals industry includes complete rolling mill installations including all auxiliary equipment for ferrous and non-ferrous metals, iron, alloy iron and steel rolls, Medart cold finishing equipment, carbon and alloy steel castings, fabricated steel plate or cast-weld design weldments, steel plant equipment, and heat and corrosion resisting alloy castings.

BLAW-KNOX

BLAW-KNOX COMPANY

Foundry and Mill Machinery Division
Blaw-Knox Building • 300 Sixth Avenue
Pittsburgh 22, Pennsylvania



Two Lewis four-high reversing cold mills used for the cold reduction of strip aluminum and copper-base alloys

BLAW-KNOX high-speed precision non-ferrous mills for rolling thin gauges

Meeting the growing demand for extremely thin non-ferrous metals, requires modern, versatile equipment, capable of high speed production of uniformly high quality.

Lewis four-high reversing cold mills provide built-in versatility and high speed delivery. Electric tension controls permit a substantial increase in the speed and weight of coils being rolled. Automatic X-ray gauge keeps a constant check on thickness. Dual coolant systems make it possible to roll different non-ferrous metals. Operation of the mill is efficient and convenient, with controls placed to provide the greatest convenience for the operator.

Lewis mills for rolling all types of extremely thin non-ferrous metals, have the design leadership that pays off in increased output of uniformly high quality.

BLAW-KNOX

BLAW-KNOX COMPANY

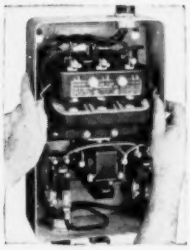
Foundry and Mill Machinery Division
Blaw-Knox Building • 300 Sixth Avenue
Pittsburgh 22, Pennsylvania

CLARK Type "CY" Starters need less maintenance ...when they do, it takes less time!

All parts in Clark Type "CY" AC magnetic starters are designed for dependable, heavy-duty, long-life operation. The exclusive "CY" principle of arc quenching—using strong multi-turn magnetic blowouts and double-break contacts—substantially lengthens contact life by minimizing arcing effects. Hundreds of thousands of Type "CY" starters in actual service have proved that these features mean less frequent maintenance.

When service or alteration is required either because of wear or change of application, Clark Type "CY" design makes the work easier and much faster. All parts are readily accessible from the front—screw-driver and wrench are the only tools needed. Service kits are available for all replacements. Times shown below include all operations, starting with a wired unit in a cabinet. The starter illustrated is Size 2, but servicing other sizes is correspondingly simple.

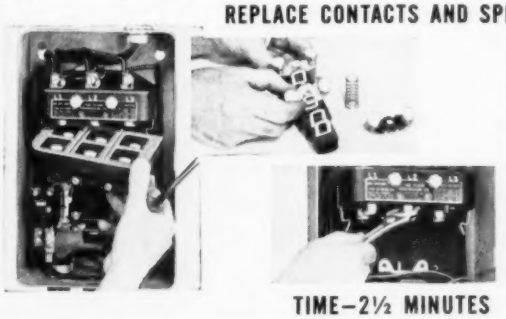
INSPECT CONTACTS AND SPRINGS



Simply open snap-action clips to release lower arc shield, exposing all contact surfaces to view. Replace arc shield after inspection. No tools required. Contact springs are in view at all times.

TIME—10 SECONDS

REPLACE CONTACTS AND SPRINGS



Loosen two captive screws holding movable contact arm in place. Release lower arc shield by opening snap-action clips. Remove contact arm and lower arc shield together. Movable contacts are removed by a simple twist to depress springs. Remove springs. Stationary contacts are loosened with a wrench. Reverse operations for installing new springs and contacts.

TIME—2½ MINUTES

REPLACE COIL

Remove snap-in pin to release armature. Remove coil connections. Remove coil clamps held by two captive screws. Coil drops free. Reverse operation for replacement.

TIME—2 MINUTES

REPLACE MAGNET ASSEMBLY

Remove contact arm. Remove armature and coil. Take out 4 holding screws and lift out magnet. Reverse operation for installing new magnet assembly.

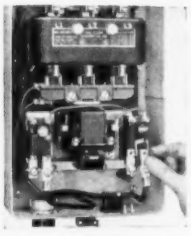
TIME—4½ MINUTES

ADD CONTROL CIRCUIT CONTACT

Remove main contact arm. Attach new control circuit block with stationary contacts to base plate (one screw). Mount movable control circuit contact and spring on main contact arm (one screw). Reassemble.

TIME (Exclusive of Wiring)—1½ MINUTES

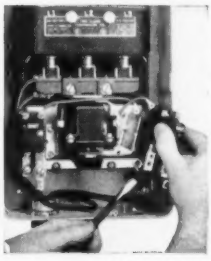
CHANGE OVERLOAD HEATER COILS



Remove overload relay cover plate held by one captive screw. Remove 2 connection screws and take out heater coil. Reverse operation for installing new coil.

TIME—2½ MINUTES
(Total for replacing both coils)

REPLACE OVERLOAD RELAY



Disconnect wiring and take out 2 screws holding relay mounting bracket to base plate. Remove old relay from mounting bracket. Reverse operation for replacement.

TIME—4 MINUTES

REMOVE STARTER FROM CABINET

Disconnect external wiring. Loosen or remove 3 screws holding starter to base plate (Note: on size 2 and smaller, all screw holes are slotted and screws need only be loosened). Lift starter from cabinet.

TIME—1½ MINUTES

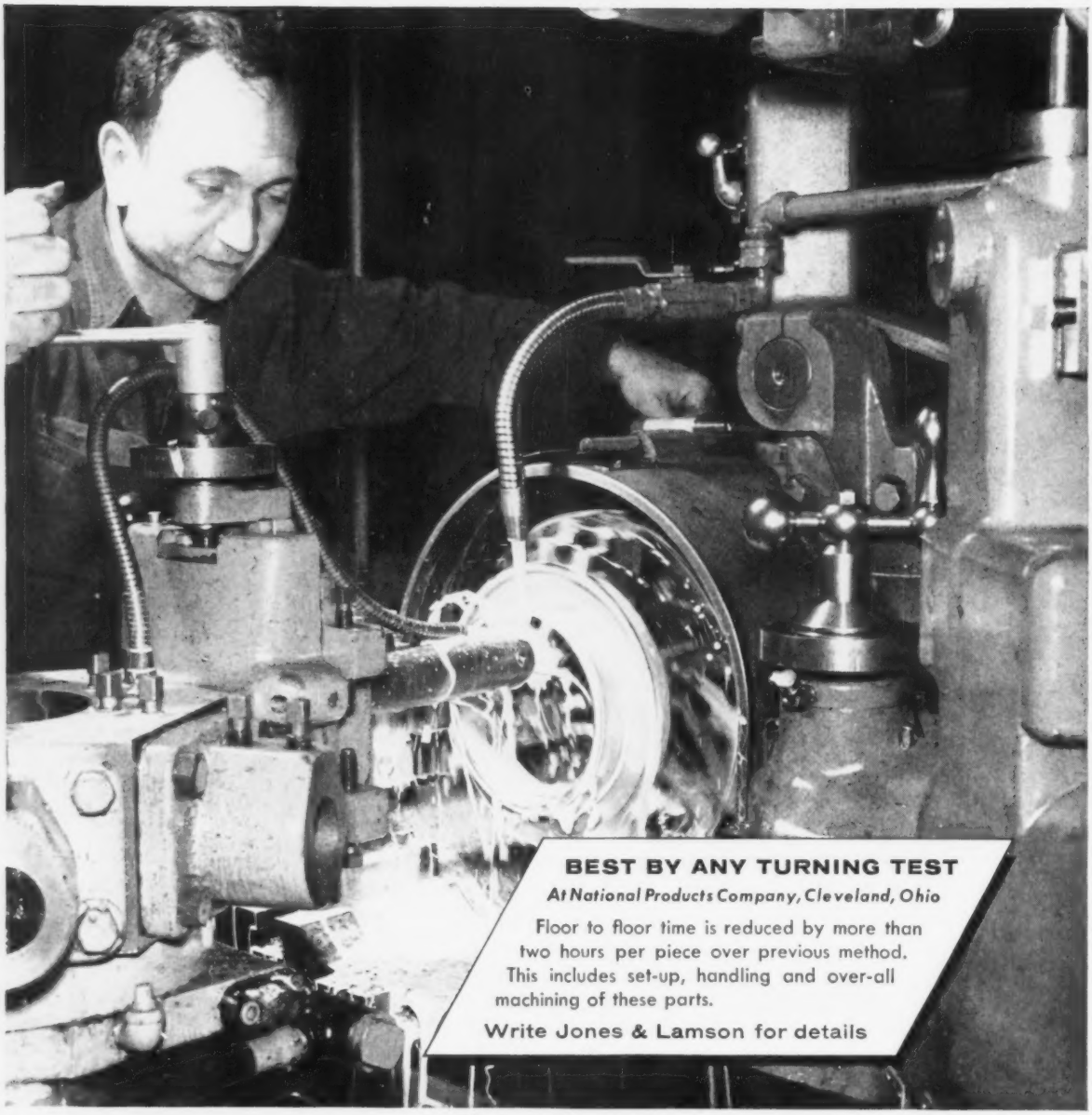
Clark Type "CY" AC Magnetic Starters are now available in sizes 0 through 4.
For complete information contact your nearest Clark distributor or sales office, or write us direct.

The **CLARK** **CONTROLLER** *Company*

Everything Under Control

1146 East 152nd Street • • Cleveland 10, Ohio

IN CANADA: CANADIAN CONTROLLERS, LIMITED • MAIN OFFICES AND PLANT, TORONTO


BEST BY ANY TURNING TEST
At National Products Company, Cleveland, Ohio
Floor to floor time is reduced by more than two hours per piece over previous method. This includes set-up, handling and over-all machining of these parts.
Write Jones & Lamson for details

Jones & Lamson turret lathes are built and powered to produce *MORE CHIPS per tool*
MORE PIECES per hour
MORE PROFIT per job
than any other turret lathe of comparable size!

JONES & LAMSON

the man who needs a new machine tool is already paying for it

JONES & LAMSON MACHINE COMPANY, 511 Clinton St., Springfield, Vt., U.S.A. J&L MACHINE TOOL DIV.

For the finest in Mechanization

JEFFREY CHAIN

makes good equipment better

Chain for transmission of power—providing maximum strength with minimum weight, but with ample reserve strength to withstand sudden and heavy overloads. Chain for every elevating and conveying need—built for rigorous and continuous service under the most trying conditions.

Jeffrey offers a complete line of chain, with sprockets and attachments to suit. Equipment manufacturers from coast to coast rely on these Jeffrey products to give their equipment greater dependability. Plant operators employ them to hold down costs.

Jeffrey chain and accessories are stocked for your convenience by your Jeffrey distributor. For help in selecting chain for any job, call them or get in touch with The Jeffrey Manufacturing Company, 925 North Fourth Street, Columbus 16, Ohio

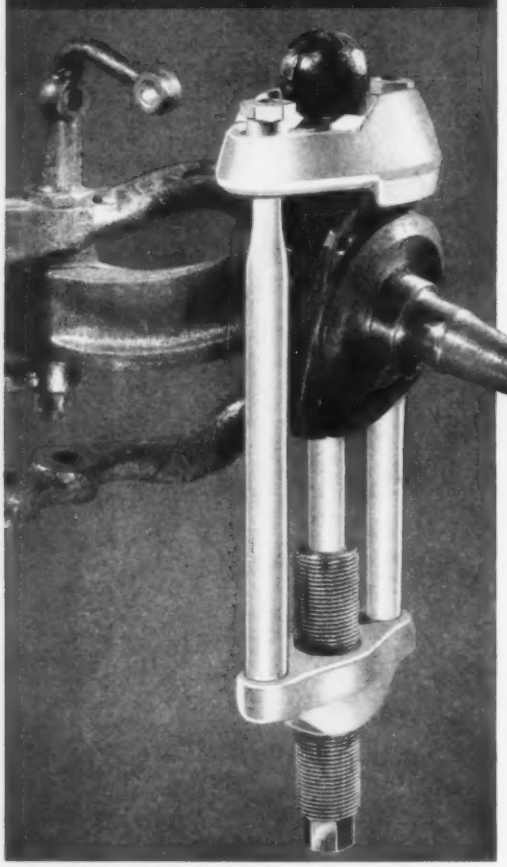
We can help you with modern, efficient equipment for Materials Handling • Chain Applications • Materials Reduction • Processing • Sanitation • Mining... and with a contract engineering-manufacturing service for your products. Jeffrey guarantees your enthusiasm!

JEFFREY

Founded in 1877

THE JEFFREY MANUFACTURING COMPANY • COLUMBUS 16, OHIO

Where "HIGH PHYSICALS" are a "must"



...specify

BL Strain-TEMPERED BAR STEELS

Here is an exacting application where the use of Bliss & Laughlin's Strain-Tempered Steel simplified a machining problem and eliminated service failure.

The yoke posts in this pin press are subjected to heavy stresses when the screw exerts full pressure, thus requiring a tough, high-tensile steel.

Formerly made from heat-treated C-1035 and C-1040, these posts gave considerable trouble during fabrication because of distortion and poor machinability.

The substitution of C-1144 Strain-Tempered Steel has provided the high strength needed with an accompanying increase in machinability and freedom from warpage . . . saving costly heat treating and giving greatly improved service life.

Screw Yoke Post for removing king pin from universal joint. Bar members made of B&L Strain-Tempered Cold Drawn Steel.

Let B&L engineers show you how to get similar savings with the use of Strain-Tempered Bar Steels.

Write for your copy of our new Bulletin No. 55 on Strain-Tempered Bar Steels.

Closely controlled furnace treatments insure uniform Strain - Tempered Steel Bars.

BLISS & LAUGHLIN, INC.

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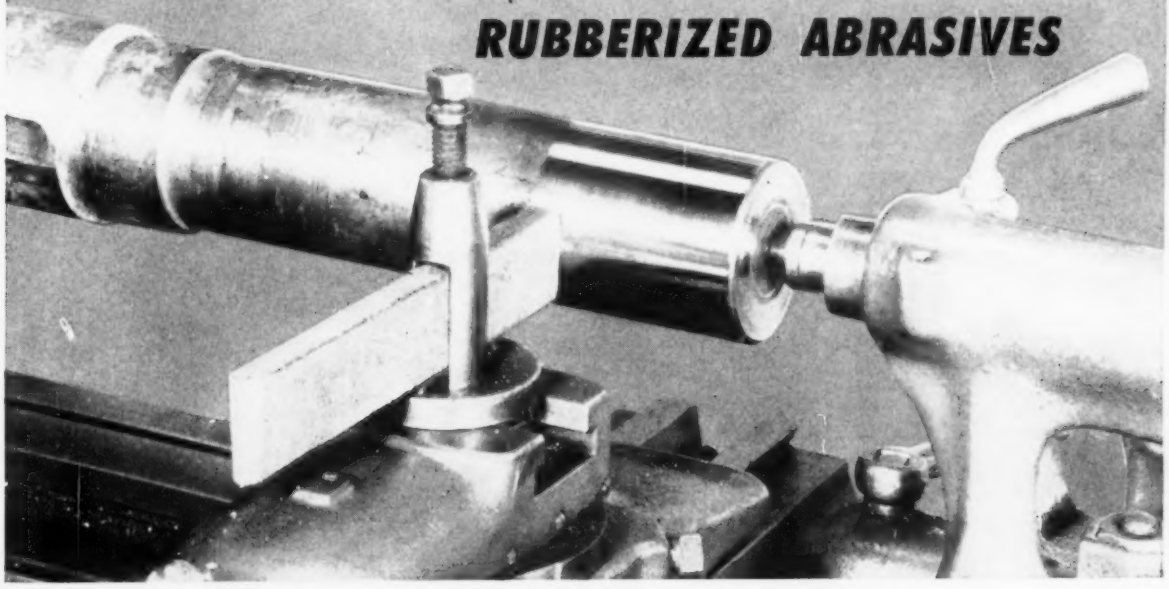
SEE IMPROVED QUALITY AND IMPORTANT SAVINGS

IN THE FINISH

PROVIDED BY CRATEX

RUBBERIZED ABRASIVES



MILK PROCESSING EQUIPMENT

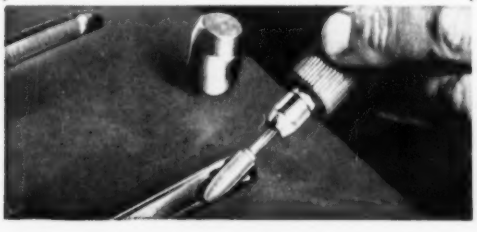
Polishing hard to reach spots on stainless steel with grinding wheels and emery paper proved too slow with poor results. Cratex cones Nos. 1340-C, 1359-C, 1340-M and 1359-M produced a highly polished, scratch-free surface much faster. Easy cleaning and less danger of bacterial contamination resulted.

Field Application Report #121

CAST IRON PLASTIC MOLDS

Final finishing of molds for glass reinforced plastic articles was unsatisfactory for efficient pressure molding and product appearance. Cratex 112-M and 216-M wheels and 1358-M cones produced the required fine finish and greatly reduced or eliminated finishing on molded articles and improved product appearance.

Field Application Report #115



In virtually every metal working operation where a high degree of surface smoothness is required, Cratex Rubberized Abrasives lower costs and improve quality. They are used successfully on hard and soft metals . . . for deburring, smoothing and polishing . . . in tool and die shops . . . on production lines . . . and in the full range of machined and fabricated metal products.

Use Cratex to replace many slow, hand operations, to increase dimensional control, and to eliminate many multi-step operations. Cratex lowers costs, saves time and rejects because it finishes faster, more smoothly, and with minimum danger to tolerances. Order Cratex in Wheels, Points, Blocks, Sticks or Cones—in four grit textures.

TEST **CRATEX** IN YOUR OWN PLANT

WITH THIS NEW POLISHING KIT

24 ITEMS FOR ONLY **$12.50**

Wheels, Blocks and Cones in a variety of grit textures, to demonstrate how CRATEX can save you money and improve quality in your own operations.

☐ Here is our P. O. for the CRATEX Polishing Kit, at $12.50 (Will be sent thru industrial distributor in your area)

☐ Please send complete CRATEX catalog (Free)

Name _____

Company _____

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Street _____

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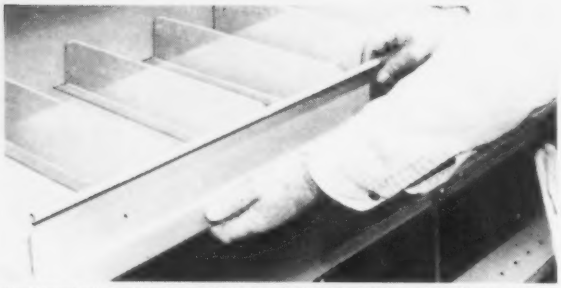
CRATEX MANUFACTURING CO.

81 Natoma St., San Francisco 5, Calif.

Only New HALLOWELL *ERECTOMATIC*® Steel Shelving

cuts assembly time, permits fast repositioning of shelves —gives you these plus features



STRAIGHT-IN, STRAIGHT-OUT SHELF CHANGE. No tilting. No dismantling. No interference with any other shelf.

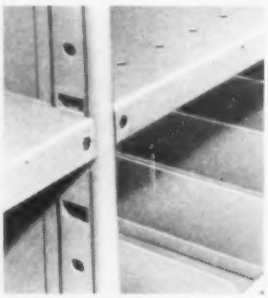
No matter what type of shelving you need—open, closed, bin units, ledge units, counters or cabinets—new Hallowell ERECTOMATIC® steel shelving makes the job easy. The unique built-in locking device*—developed by SPS—speeds assembly and rearrangement of shelves. To position a shelf, slide it into place on the shelf supports, press the locks, and the shelf is locked. To reposition a shelf, release the locks, pull the shelf straight out, slide it straight in on its supports at the new location, and press the locks. It takes only seconds to do the complete job. Made of prime steel, phosphate coated, and finished in SPS green baked-on enamel—other colors are available. Hallowell ERECTOMATIC steel shelving is stocked by leading industrial distributors and shop equipment dealers. For complete information, see the one nearest you. Or write Hallowell Shop Equipment Division, STANDARD PRESSED STEEL CO., Jenkintown 17, Pa.

*Patent applied for

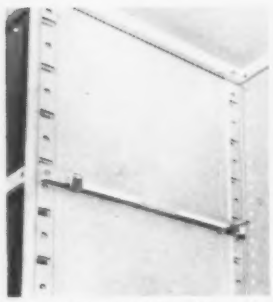
INDEPENDENT SHELF POSITIONING. Each shelf can be repositioned individually in seconds.

FULL USE OF SHELF AREA. No tees or angles, and beaded posts save valuable space.

COMMON SIDE PANELS AND POSTS save material between adjacent units in a rack. Back and side panels are one-piece.

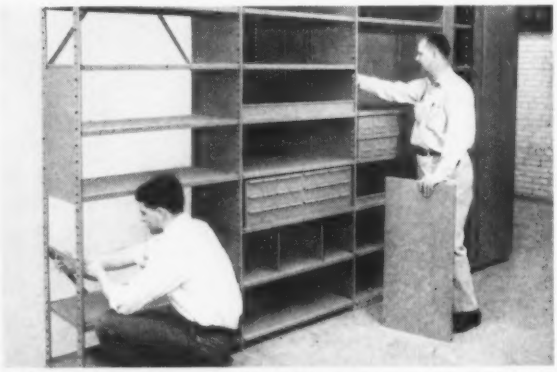


BEADED POSTS AND FLANGED SHELVES prevent snagging of clothing or stored goods, protect workers.



FULL DEPTH SHELF SUPPORT. No buckling possible. Reinforcements can be added when required.

4 CLASSES OF SHELVES. Regular, medium, heavy and extra-heavy construction meets all load requirements.



TWO MEN ASSEMBLED new Hallowell ERECTOMATIC steel shelving in just over 10 minutes. Closed unit was 36 in. wide, 18 in. deep, 7 ft. 3 in. high, complete with seven shelves. Standard models of other design required 13-55 min. Table shows test results.

Brand	Time to Assemble (Min.)	Units Per Hour
Erectomatic	10.42	5.75
A	13.23	4.53
B	14.24	4.21
C	16.30	3.68
D	18.12	3.31
E	25.03	2.40
F	55.03	1.09

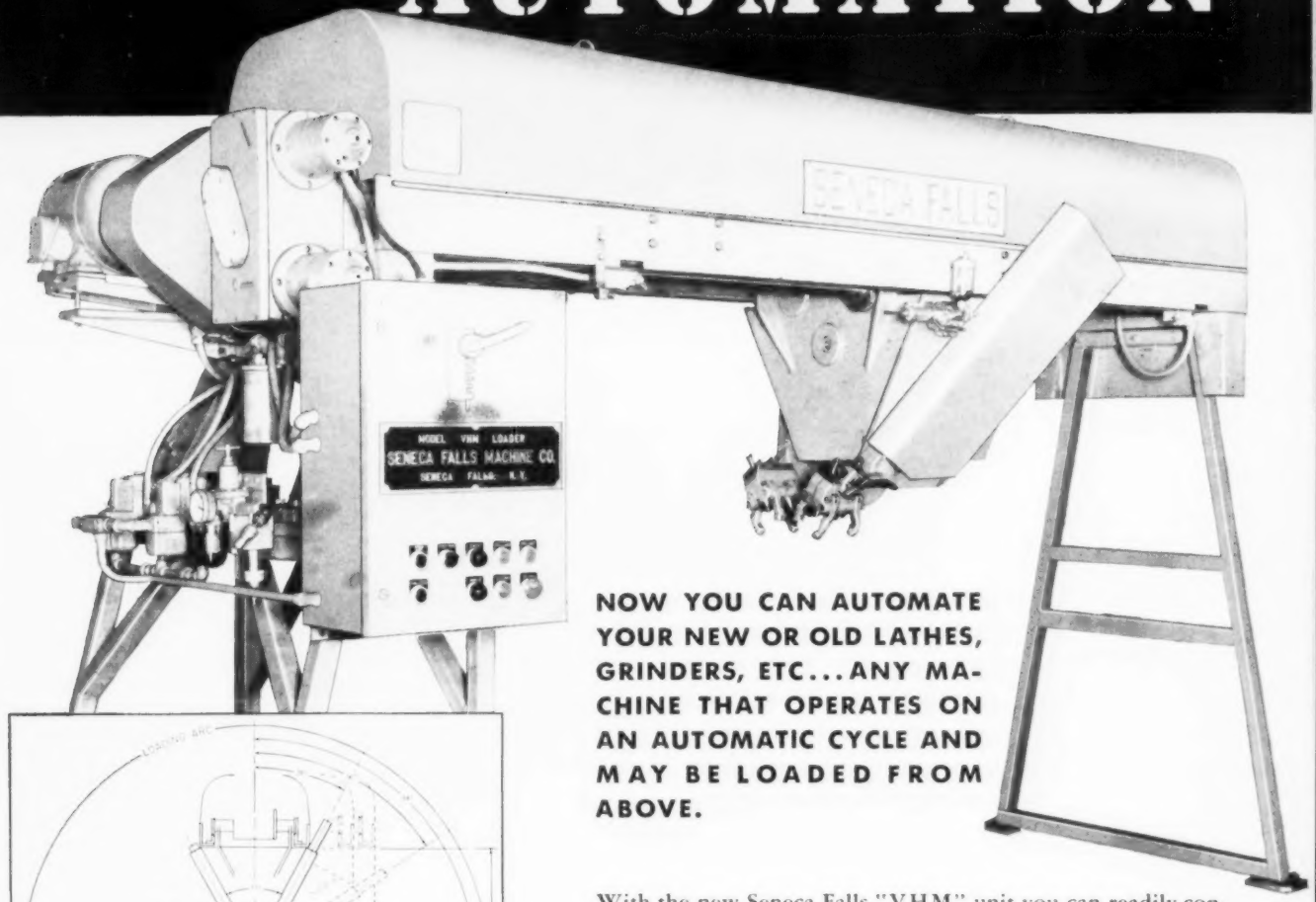
HALLOWELL® SHOP EQUIPMENT DIVISION

STANDARD PRESSED STEEL CO.

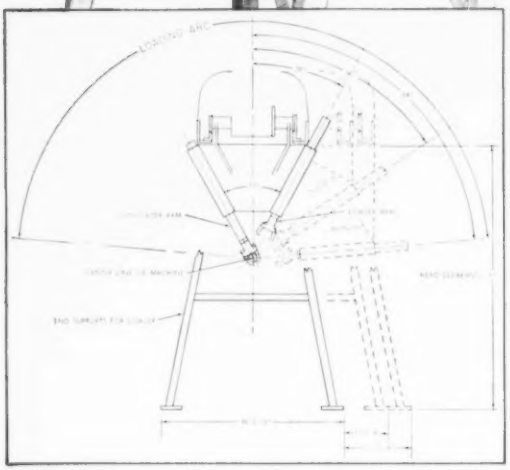
SPS

JENKINTOWN PENNSYLVANIA

PACKAGED AUTOMATION



NOW YOU CAN AUTOMATE YOUR NEW OR OLD LATHES, GRINDERS, ETC... ANY MACHINE THAT OPERATES ON AN AUTOMATIC CYCLE AND MAY BE LOADED FROM ABOVE.



With the new Seneca Falls "VHM" unit you can readily convert your existing automatic cycle machines into a single automated production line with minimum pain or strain. Since all movements are purely mechanical, installation and maintenance of equipment are simple and require no knowledge of electronics.

Put these advantages to work for you:

- Wide range adaptability.
- Lower handling costs per piece.
- More production per hour.
- No operator fatigue.
- Fewer operators per production line.
- Fewer "human reflex" accidents.
- Simplification of plant layout.
- Standardization of Loader and Transfer Equipment.
- Quick change-over.
- Low maintenance costs.

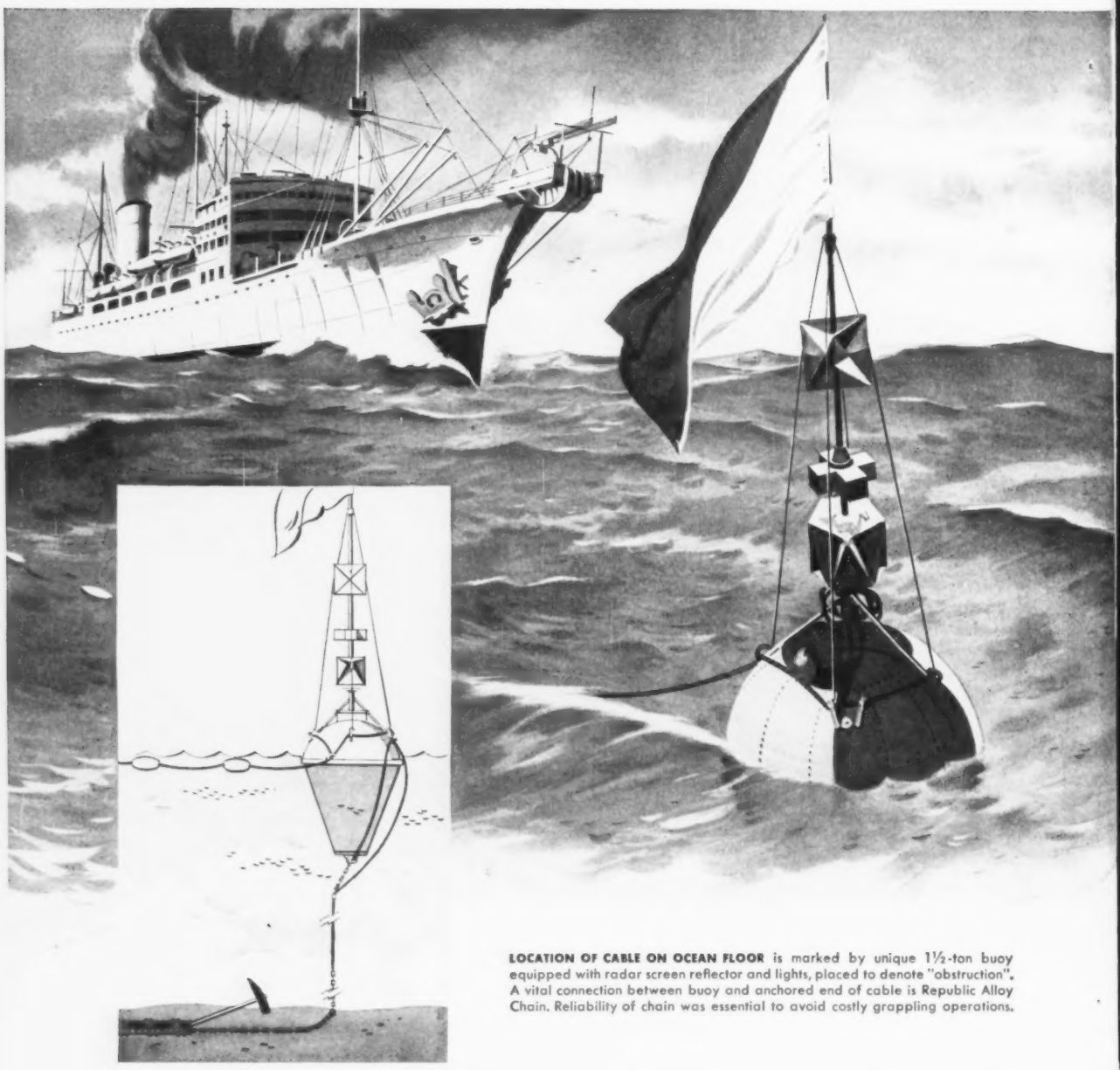
Phone, wire or write for all the facts

SENECA FALLS MACHINE CO.
Seneca Falls, New York

SENECA FALLS MACHINE
ENGINEERED FOR PROFIT

Automatic and Semi-automatic Lathes • Automatic Drilling and Centering Machines
Automatic Work Drivers • Production Tracer Lathes • Automation and Work Handling Devices • Special Production Machinery

Republic Alloy Chain



LOCATION OF CABLE ON OCEAN FLOOR is marked by unique 1½-ton buoy equipped with radar screen reflector and lights, placed to denote "obstruction". A vital connection between buoy and anchored end of cable is Republic Alloy Chain. Reliability of chain was essential to avoid costly grappling operations.

REPUBLIC

REPUBLIC STEEL

World's Widest Range of Standard Steels

helped "hold the line"

FOR TRANSATLANTIC TELEPHONE CABLE

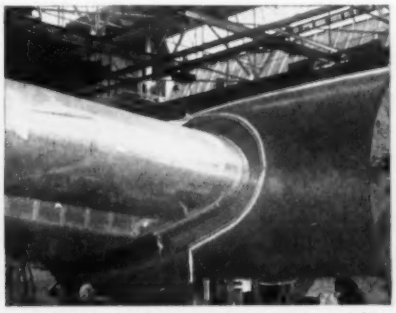
A number of times during laying of the recently completed twin transatlantic telephone cable, it was necessary to suspend operations while the cableship Monarch returned to port for additional cable. Whenever Republic Alloy Chain was used, it helped "hold the line", securely anchoring a specially built marker buoy to the cable resting on the ocean floor. Result: the cable was easily recovered, spliced to the newly arrived portion, and laying resumed without incident.

Security of the buoy and recovery of the cable depended on the built-in quality of Republic Alloy Chain. Uniform strength in every link spelled the difference between a smooth, on-schedule operation and costly, grappling delays.

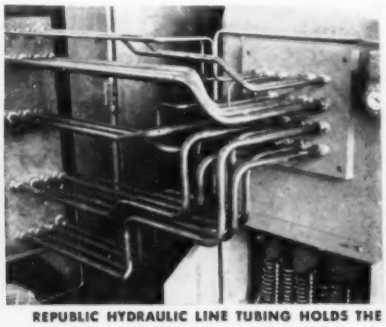
Attention to quality and reliability in every detail was vital to success in completing the $42,000,000 transatlantic telephone cable. As it has in countless product and production applications in every industry, Republic Chain met every requirement with flying colors.

Whatever your chain problem or application, it will pay you to get all the facts on Republic Chain Products. Types available include fire welded, electric welded or weldless chain in high carbon, low carbon, alloy and stainless steels, or wrought iron. Simply contact your Bolt and Chain Division representative, or mail the coupon for further information.

CONTINUOUS GALVANIZED HOLDS THE LINE on costs when used for production-line products requiring severe forming. Expensive hot-dip galvanizing after fabrication can be eliminated. The tight, corrosion-resistant zinc coating of Republic Continuous Galvanized Sheet Steel will not crack, flake, or peel under any forming process permitted by the base metal. For complete information on this new production-line material, mail coupon.



TITANIUM HOLDS THE LINE on excess weight in this new commercial airliner. By substituting titanium for other metals normally used in nacelle construction, a weight savings per airplane was achieved equal to one passenger and his luggage. Strength and safety were not impaired in any way. In addition to great strength-to-weight ratio, titanium offers excellent corrosion resistance. Send coupon for details.



REPUBLIC HYDRAULIC LINE TUBING HOLDS THE LINE where high-pressure dependability is vital. Reason is Republic's ELECTRUNITE® welding process coupled with closely controlled finishing operations. Starting with flat-rolled steel, and working to a highly restricted specification, maintains a flaw-free surface on both the O.D. and I.D., and assures a uniform wall thickness. The result is a quality tube with uniform strength and ductility, the basis of unsurpassed performance in high-pressure applications.

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- ☐ Chain Products
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6 good questions about aluminum FABRICATING

...and 6 good answers by Kaiser Aluminum Distributors

If you have a problem in fabricating aluminum, the chances are your *Kaiser Aluminum Distributor* can help you solve it. He has metal know-how and experience with many fabricating operations. Use his fund of technical knowledge, backed by the engineering ability of Kaiser Aluminum's field staff.

Here are the answers your Kaiser Aluminum Distributors have given on specific fabricating questions asked by aluminum users in various parts of the country. Questions such as these may also be bothering you.

Q. We machine high pressure fittings from 3 1/2" diameter 2024-T4 rod. The fittings call for extremely fine tolerance on 1 1/8–16 threads. The threads are O.K. as machined, but after anodizing they are oversize. We've scrapped too many completed pieces already . . . need an answer fast. What's the solution?

A. After finding that both new and old machined pieces were acceptable, a check was made of the anodized pieces. Here it became evident that the thread was enlarged because the pieces were *over-anodized*. By remaining in the anodizing bath too long, too great an increase in overall dimensions resulted. Closer control of anodizing time resulted in threads kept to close tolerances after they had been anodized.

Q. After welding 2" wide by 7/8" thick extrusions, the welds are cracking. We weld with an inert gas shielded arc. Why are the welds cracking?

A. A check showed that the extrusion was designed with a non-uniform cross section, varying from 1/8" to 7/8" across the 2" width. By preheating across the entire joint and then welding, a sound weld, free of cracks, was obtained.

Q. Can aluminum be joined by brazing? If so, what alloys are recommended for this process?

A. Yes, brazing is a highly satisfactory method of joining certain aluminum alloys . . . particularly 1100, 3003, 6053 and 6061 plus #11, 12, 21 and 22 brazing sheets. These alloys can be joined by any of the three common brazing processes: torch, furnace and dip brazing.

Q. We fabricate aluminum firing pins from 3/16" round 2017-T4 standard screw machine stock. The points of the pins must be held to exact tolerances. But the pins are so small that it is difficult to keep the points from breaking. Have you a solution?

A. In this case, the firing pin points must be formed as close to the collet as possible. Parts are usually machined on automatics with the point-end out. It is difficult to hold to tolerances a radius or point as small as a firing pin. Carboloy tools should be used, and they usually consist of one of the following: skive tools, form tools, or a pointing tool operated as an end working tool. Sometimes small diameter parts will break off when using a form tool on a cross slide, making a plunge cut. If a skive tool or pointing tool is used with the *proper* angles, very small diameters can be machined without parts breaking.

Q. Can aluminum be bonded with adhesives?

A. Yes. There are many synthetic adhesives presently available that are excellent for bonding aluminum to aluminum or to other materials.

Q. We are using 3/16" x 3/4" extruded 2024-T3 aluminum bars to fabricate a part into the shape of a question mark. But we have had difficulties with springback and cracking. How can we correct this?

A. This manufacturer was using an alloy in a condition that gave maximum springback. After some study it was suggested that alloy 3003-H14 be used because of better formability, less springback with no cracking. Also the strength factor was entirely satisfactory. Accordingly 3/16" x 3/4" 3003-H14 strip, cut from sheet and round-edged at the warehouse, was used. This material not only worked perfectly, but the customer cut his fabricating time almost 52 percent.

* * *

For the *right* answer, ask your Kaiser Aluminum Distributor.

Kaiser Aluminum Distributors have helped hundreds of fabricators find the answers to difficult problems. Whether it's selecting the right material for a particular job, suggesting more economical methods of operation, or solving complicated production problems, your Kaiser Aluminum Distributor is ready to give you instant assistance.

Naturally, you can always depend on him for prompt service in supplying you with aluminum cut to your specifications *as you need it*. Take advantage of the personalized service and technical know-how offered by your Kaiser Aluminum Distributor. Call him today!

Kaiser Aluminum

See "THE KAISER ALUMINUM HOUR." Alternate Tuesdays, NBC Network. Consult your local TV listing.

Kaiser Aluminum Distributors

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DAVENPORT, IOWA Nichols Wire & Aluminum Co. Phone: 3-1895
DENVER, COLORADO ABC Metals Corp. Phone: Acoma 2-0633
DETROIT, MICHIGAN
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Honolulu Iron Works Phone: 5-0961
Permanente Cement Co. Phone: 5-2541
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Earle M. Jorgensen Co. Phone: Lorain 7-1122
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Any workman who can tell red from green and count to ten can test the exact strength of pickling solutions . . . *the exact percentage of iron content*, and the solution percentage of sulphuric acid, muriatic acid, alkali etc. in metal cleaning tanks.

Ferro Pickle Pills provide a quick, accurate test to augment periodic titration testing, or as a "test within a test". They can assure full-capacity cleaning with fewer rejects, save money by eliminating premature dumping of tanks. That's why more and more companies are using them. Why don't *you* try them? Write today for literature and prices.

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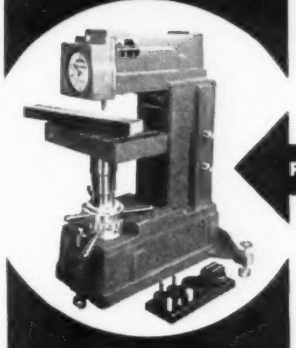
2 Applications (REGULAR AND SUPERFICIAL) 1 Tester



KENTRALL MODEL CT-2

Hundreds of installations over the past few years have proved the economy of the only hardness tester which combines all scales of Rockwell Test (15 to 150 kg. loads).
The Kentrall cuts costs because it does the job of two conventional testers, requires only half the space and maintenance. Write for more detailed information, plus a list of prominent users who have switched to Kentrall.

TB148

PRICE $680.

KENTRALL
THE TORSION BALANCE COMPANY
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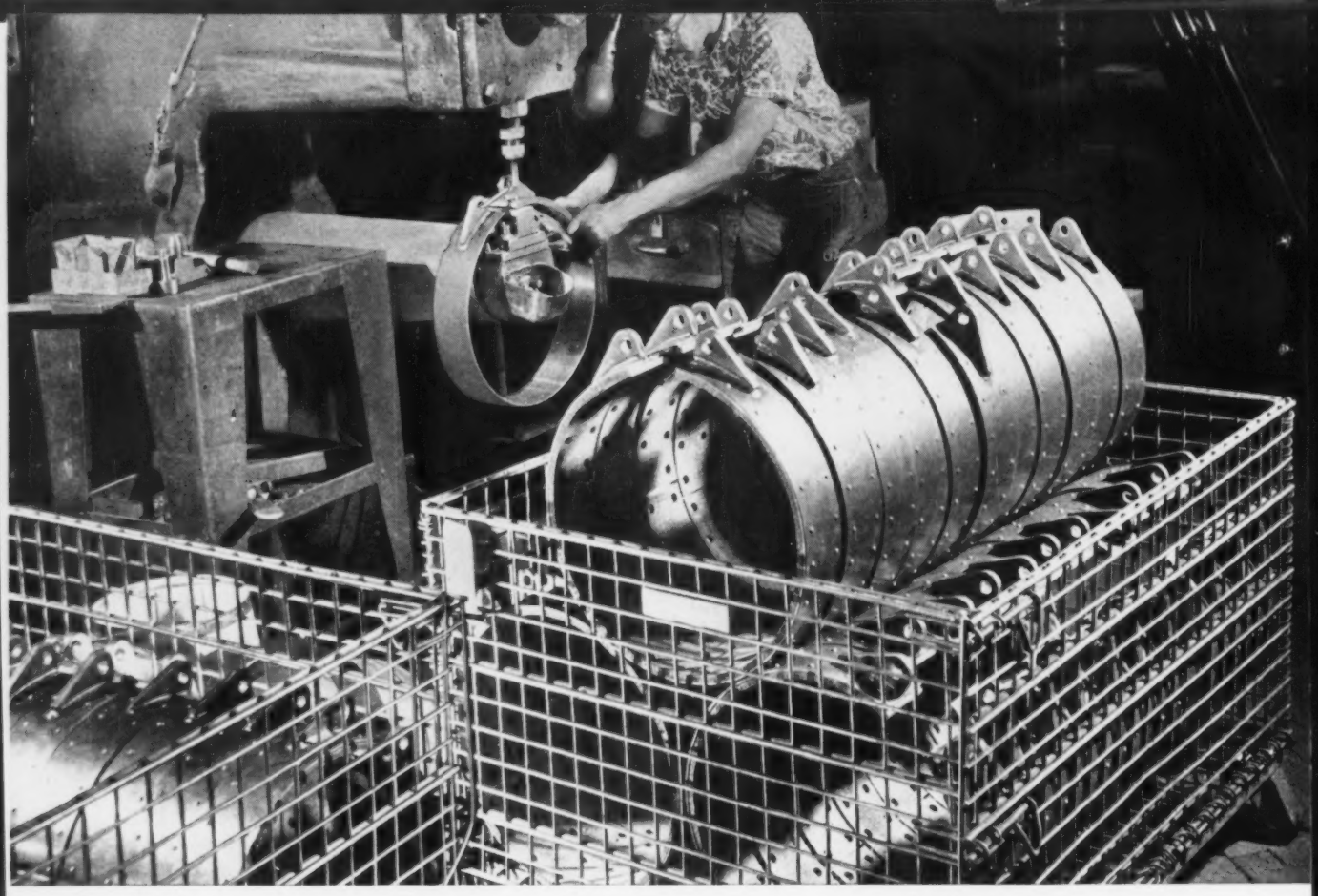

Heavy steel castings move to and from machines in Cargotainers. Able to carry heavy loads like this because of strong steel bar reinforcement engineered in the bases, Cargotainers have a high strength-to-weight ratio.

Cargotainers® . . . triple storage space

reduce handling costs and material losses at International Harvester's Milwaukee Works

Three times more storage space . . . materials handling costs down eight cents per hundredweight . . . breakage of sand foundry cores and driers materially reduced . . . safety hazards overcome.

These are the advantages International Harvester has gained at its big Milwaukee Works through the use of strong, sturdy welded mesh Cargotainers made by Pittsburgh Steel Products, a division of Pittsburgh Steel Company.

One of the largest International Harvester Plants, Milwaukee Works, supplies over 8,000 different items to other IH plants which produce Harvester's broad line of farm equipment, tractors, trucks and construction equipment.

The 43-acre plant houses several divisions which produce a variety of items including gray iron castings, diesel injection pumps, gears and sheet metal parts. This diversity of production plus limited space for expansion has created a materials handling situation and an acute awareness of the problem.

Milwaukee Works is one of the few plants its size to compute materials handling costs on a weekly basis. Detailed, all-inclusive, these cost studies enable production executives to detect trouble spots before they develop.

• **Three cost watchers**—Ray Seidens, Materials Handling Engineer; George Pusey, Core Room Superintendent; and George Fleming, Staff Assistant to the Works Manager, are the men who keep the closest check on Cargotainers' performance at Milwaukee Works.

Mr. Fleming feels that proper materials handling is the biggest opportunity a metal-working plant has these days to lower costs.

"Any materials handling system," he says, "has to be adaptable to changing production volume. The cost has to be balanced against the production load before you can compute savings. Materials handling is basically a question of economics."

To explain Milwaukee Work's materials handling approach, Mr. Pusey points to experience in their core room.

• **Before Cargotainers,** sand cores were handled on wooden pallets.

Easily stacked three-high, Cargotainers protect cores until the foundry needs them. At International Harvester's Milwaukee Works Cargotainers tripled available storage space.

When Cargotainers replaced pallets to move sand cores (above), breakage was cut materially.

Three layers of cores, separated by cardboard, were the maximum load per pallet. They could not be stacked. There was little protection against core slipping off the pallets as they were trucked from the core room some 700 feet to the foundry. When pallets were stored side by side, cores sometimes were rubbed and nicked. This resulted in excess metal on the castings, requiring extra cleaning before the casting could be shipped. The use of Cargotainers solved these problems and helped effect a 6.4 percent reduction in this phase of handling costs in a single year.

• **Cargotainers the answer**—In handling driers Milwaukee Works found that breakage losses were even more pronounced than for the sand cores.

A drier damaged in handling could scrap as many as 10 castings before the damage was detected. When you're talking about castings weighing up to 2,800 pounds, the damaged drier might be scrapping hundreds of dollars worth of castings in a single day.

In another unit, standard wooden boxes were used before Cargotainers came on the scene. The boxes weighed 210 pounds each and had 19.8 cubic feet of storage space. Comparably sized standard Cargotainers—made of tough reinforced welded steel wire fabric on two-inch centers—provided 26.6 cubic feet, at approximately same tare weight per container. In other words, lift trucks carry 6.8 cubic feet more material in each Cargotainer than in wooden boxes.

Cargotainers, because of their sturdy, clearview steel base construction reinforced with ¼" bars, can easily be stacked three high, with safety. Since loaded pallets can't be stacked, three Cargotainers are placed in the space one pallet required.

• **In your plant**—Harvester's Milwaukee Works experience with Cargotainers is being duplicated in hundreds of plants in a variety of American industries. Whether efficient, safe and economical materials handling in your plant requires 200 or 2,000 Cargotainers—Pittsburgh Steel Products can serve you.

A national staff of materials handling engineers is available to help survey your materials handling problems and adapt any one of the dozens of standard Cargotainers to your operation. Contact one of the offices listed below for information.

Cargotainers give radiator tops full protection in storage and transit.

Cargotainers®

by Pittsburgh Steel Products

a division of Pittsburgh Steel Company

Grant Building • Pittsburgh 30, Pa.

District Sales Offices

Atlanta	Columbus	Detroit	New York	Tulsa
Chicago	Dallas	Houston	Philadelphia	Warren, Ohio
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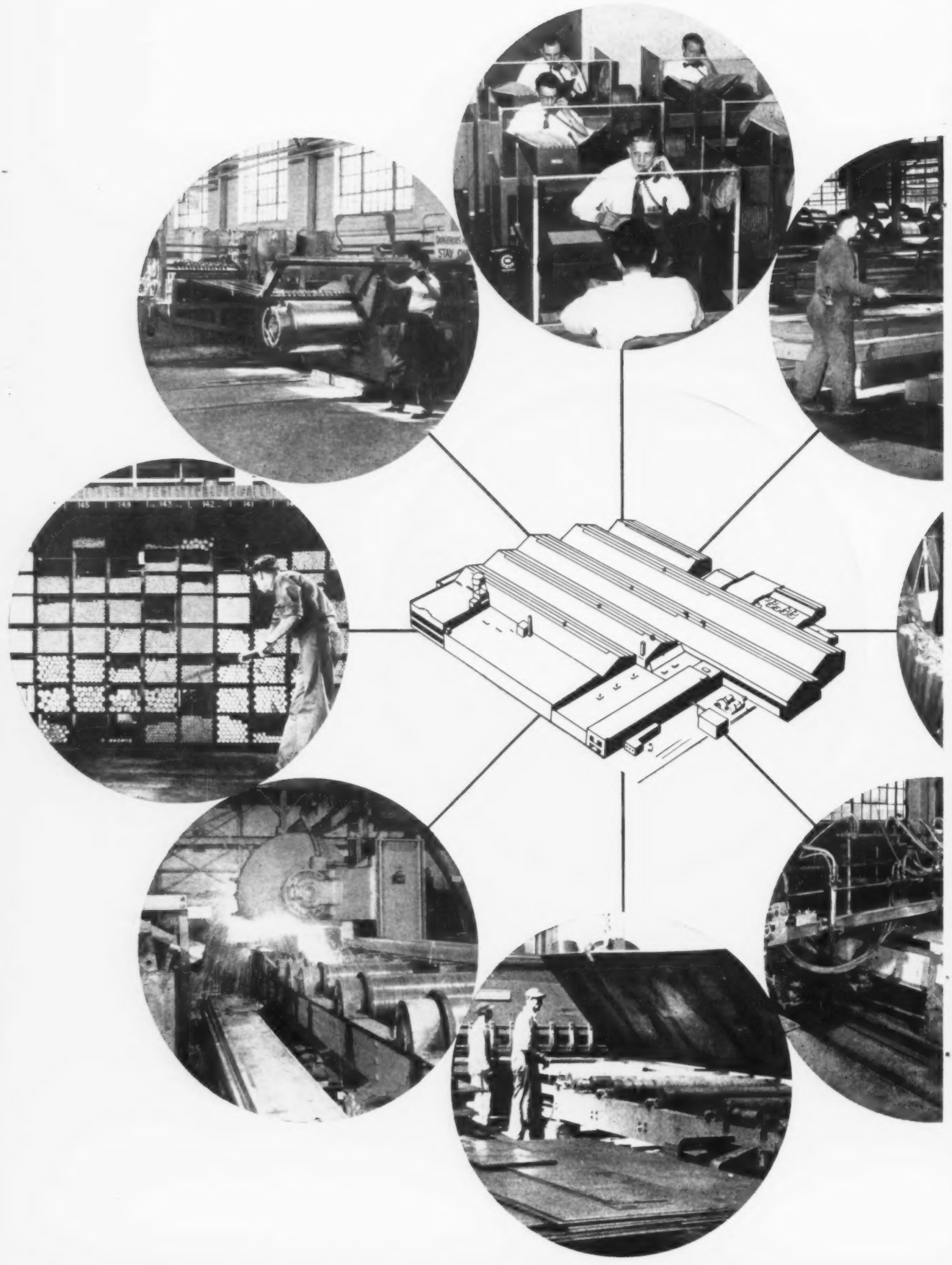
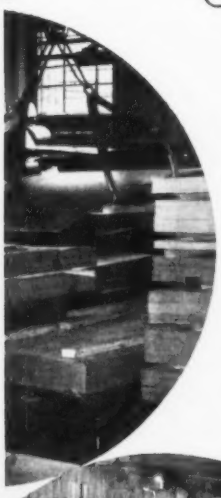
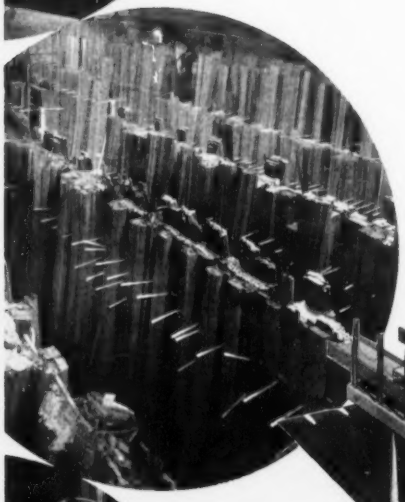
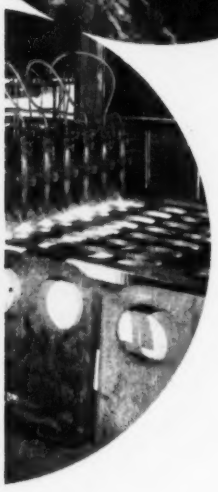


"The Department Store of Steel"

Call Your J & L Warehouse for Fast Steel Service



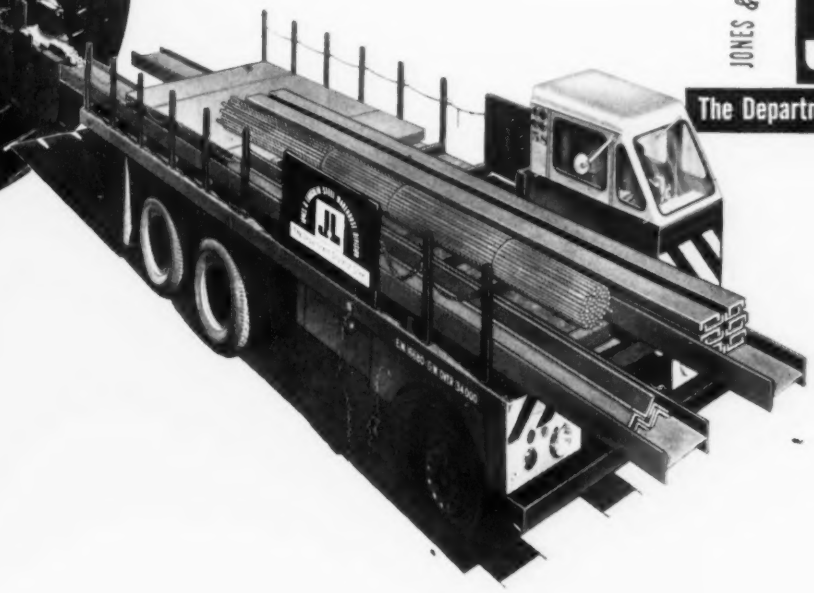




It takes a combination of many things to make a warehouse a "department store of steel."

First of all, it takes steel—in a wide range of sizes, shapes and analyses. Next it takes processing facilities and equipment—modern and complete. Then add people—trained, experienced and service minded people. Finally, back them up with really *prompt* delivery service.

Give us a call on your next steel order and you'll see why your J & L Steel Warehouse is your "Department Store of Steel."



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The Department Store of Steel

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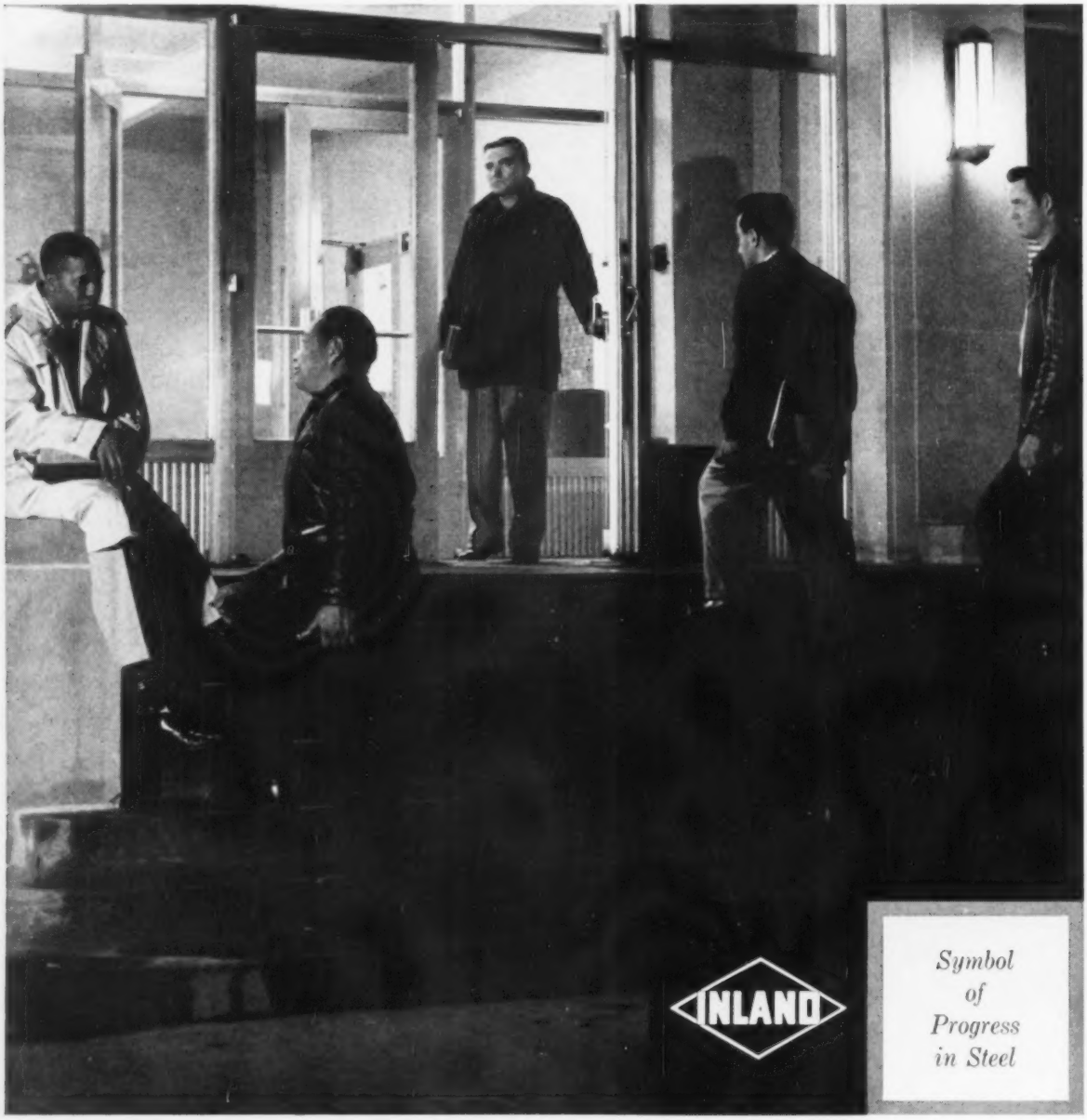
The threshold of better steel making

You'd be surprised at the number of Inland people, like these men, who spend their free time studying chemistry, metallurgy, physics—adding scientific knowledge to their already solid practical backgrounds. Inland's broad training plan, with a wide variety of formal and informal courses, covers just about every phase of the industry. Typical are the Inland-Purdue University cooperative classes in which men from our mills take college level courses in subjects related to steelmaking at Inland expense. Good investment, we find. For the results are bound to show up in better Inland service—better Inland steels—to meet *your* specific requirements.



INLAND STEEL COMPANY • 38 South Dearborn Street • Chicago 3, Illinois

Sales Offices: Chicago • Milwaukee • St. Paul • Davenport • St. Louis • Kansas City • Indianapolis • Detroit • New York

Control Actually Thinks

Researchers are working on an advanced concept of automatic control that will literally do its own thinking. Most present control setups rely on human judgment to make adjustments when input conditions change. This one, called "Teleological Control," would constantly seek a maximum level of efficiency in any machine or process. It would do this automatically.

Sales Forecasts Drop

Auto marketing experts who were predicting a 6.5 million passenger-car year are pulling in their horns. Latest estimates by some top-level Detroit executives place ultimate 1957 domestic sales at 5.7 to 6 million units. One reason for the decline: average age of cars on the road today is lower than at any time in auto history.

Smelt Ore in 220-v Unit

A new German-designed electric furnace that will operate at temperatures upwards of 3500°C (over 6300°F) is now being made in this country. It runs off a standard 220-v line, in tests converted wolframite ore to tungsten alloy in three minutes.

Titanium's Not Enough

The Air Force says further advances in aircraft will depend mostly on new materials and new processes. They're calling for materials that'll take 3000-cycle vibrations, 170-db noise levels, speeds of 4500 mph-plus and operating altitudes far greater than 50,000 ft. A titanium plane model almost completely disintegrated in tests simulating these conditions. Probable result will be bigger Air Force grants for basic research.

Fund Abuses Cited

Senate hearings on labor racketeering have bolstered the case for company-managed pension and welfare funds. Insurance companies admit that 98 pct of abuses in jointly-administered funds come from insurance fees, allowances and commissions. Union-administered funds have been raided often, but purely company-run plans apparently haven't been looted. One complaint on company-run funds: Investments are often made at high rates but dividends are counted as company money, not added to the funds.

More Coal Conveyors

Bituminous coal mine operators are investing heavily in mobile loading machines, "mother" conveyors and transfer conveyors. Shipments of mechanical loading equipment for underground mines in 1956 topped 1955 by 44 pct, in terms of capacity; 1957 is expected to be even better. The operators' goal: to boost output per man from 10.6 tons a day to 20 tons.

Evacuation Plan Ready

Plans for emergency relocation of essential government functions in time of war have been completed by Office of Defense Mobilization. Rock-bottom functions of 45 agencies would move to 85 sites located from 30 to 300 miles west of Washington. Most of the sites already have small permanent cadres capable of taking command if the D. C. area is attacked without warning.

Management Interest High

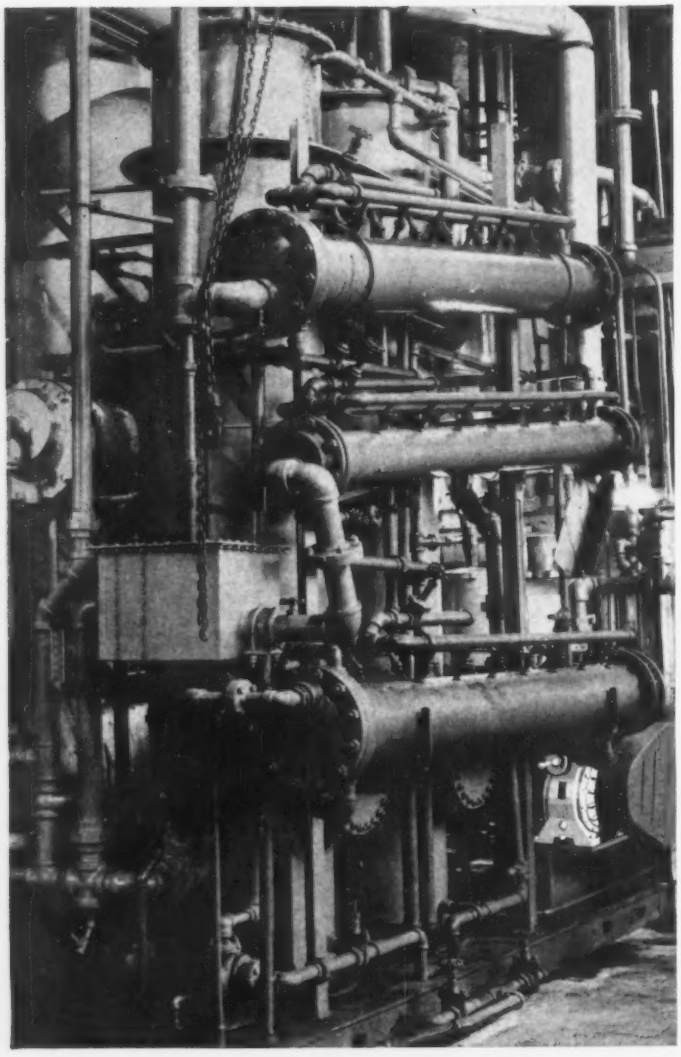
Rapid growth of interest in management training is spotlighted by latest income figures from the American Management Assn. AMA's April income alone was $1 million. This was higher than total income for the entire year 1950.

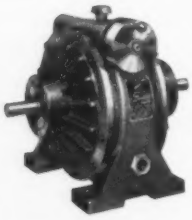
Problems Ahead?

If the Velasco Magnesium Corp. bid for the government's Velasco, Tex., magnesium plant is accepted the company won't, as many believe, automatically be in business. Dow Chemical, which is now running the plant for the government, owns the power facilities, seawater intake canal, means for making cell feed and the land around it. Government owns cell facilities and the building in which they're housed, three Dorr tanks and an alloying facility. Dow could use the cell feed for expanded operations at its Freeport, Tex., plant.

CLEVELAND SPEED VARIATOR

varies gas feed to annealing furnace need





THIS gas blower is part of the monogas system that feeds an annealing furnace. Rate of gas output from the blower is precisely controlled by a Cleveland variable speed drive.

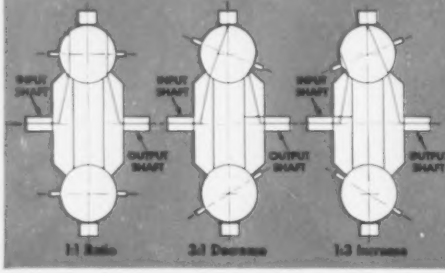
When the gas production rate must be decreased or increased to fit various annealing processes, it is easily regulated by a simple turn of the hand wheel on the drive. To maintain uniform supply of gas at all times, even if pump or compressor output varies, a simple adjustment on the Variator compensates and keeps the production rate steady.

This is one of hundreds of different applications of this unique Cleveland Speed Variator. Engineers and designers have put thousands of units into use on such diverse equipment as cigarette-making machines, textile machinery, metalworking machinery, pharmaceutical equipment, transfer tables, conveyors, testing equipment and experimental machines of many types.

Being infinitely variable, the Cleveland gives stepless speeds over a full 9:1 range—from ⅓ to 3 times input speed. Output speed on this particular application illustrated is adjusted by hand wheel, but could be regulated by either manual or automatic remote control. The Variator is available in 18 sizes, ranging from fractional to 16 hp at 1750 input rpm.

Write for Bulletin K-200 for detailed description with photographs, sectional drawings, rating tables and specifications.

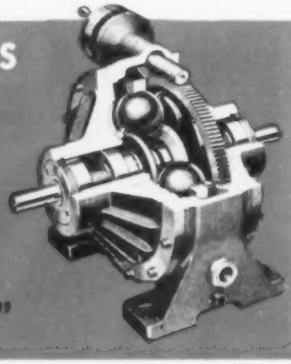
HOW THE CLEVELAND SPEED VARIATOR WORKS



Power is transmitted from input shaft to output shaft through alloy steel driving balls which are in pressure contact with discs attached to the two shafts.

Relative speeds of the shafts are adjusted by changing the positioning of axles on which the balls rotate (diagram, right, shows cutaway Variator with hand regulating wheel).

"It's the Drive That's on the Ball."



THE CLEVELAND WORM AND GEAR COMPANY

Speed Variator Division, 3282 East 80th Street, Cleveland 4, Ohio

Sales Representatives in all major industrial markets • In Canada—Peacock Brothers Limited

Steel Warehouses Sell Services and Low Total Cost

Bigger Share of Steel Market Forecast

Buying from warehouses can cut steel costs under special conditions.

Steel warehousemen are out to improve their service, count on long term market gains.—By G. F. Sullivan.

■ Ten years from now steel buyers will probably fill 20 pct more of their steel needs through warehouses than they do now. This is not only a statistical trend, it is a matter of economics and it applies to both large and small users.

It may pay you to find out what is causing this trend; to see if you are missing any chances to cut your steel costs. Warehouses are adding new services and functions.

Warehouse Take Grows—Back in 1926, warehouses accounted for 10.5 pct of all steel shipped. The figure rose to 14.6 pct in 1940. Last year it hit 21 pct. It could go to 25 pct of the total, according to C. L. Hardy, president, Joseph T. Ryerson & Son, Chicago.

Mr. Hardy made this prediction in an interview at the Roosevelt in New Orleans where the American Steel Warehouse Assn. last week held its 48th annual convention. And where, not incidentally, Mr. Hardy was elected president of the association.

The Factors—"One reason for this optimism about warehouse sales is the fact that people are discovering how much it costs to carry inventory. I'm talking here about the long term trend. Last year was one of high demand; the warehouse percentage may drop a bit this year, but for the long pull

C. L. HARDY: "We can do things it doesn't pay mills or many customers to do themselves."

WAREHOUSE SHIPMENTS: For most steel products, warehouses have upped their mill tonnage significantly.

I feel the trend is definitely up," he said.

Mr. Hardy cited recent studies by two big steel users which show that it costs between 18 and 23 pct of the cost price to carry steel in inventory for a year.

A Matter of Costs—Two short-term factors also favor warehouse buying, he noted. One is the high price of money, which leads many companies to let the warehouse carry their stock; the other is the current drive to hold down inventories. When they get low, the warehouse is often relied upon for emergencies.

You can look for a drive by warehousemen to acquaint steel buyers with what they call a more realistic appraisal of steel costs. "I'm not talking about the man who needs X tons per month for regular production—he naturally buys that from the mills. I'm talking," said Mr. Hardy, "about the man who needs, say, 10 tons of plate for maintenance. He looks at the difference between the mill base price and the warehouse price. He forgets that the mill price has no freight or handling charges. To get a mill price he orders a carload of 72-in. plate, then finds he has to cut it to 60 in. The warehouse could sell him the 60 in. plate he needs, and if he lumps it with some of his other needs he gets a better price."

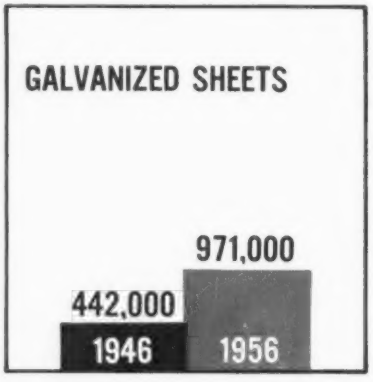
More Services Offered — "We look for a growth in this type of business as warehouses install more cutting, slitting and other processing equipment—where we can do things it doesn't pay the mills or many customers to do themselves."

Another way in which steel users may profit lies in a new approach suggested by the association's executive vice president, R. G. Welch. Mr. Welch, who has been executive secretary, was promoted at the New Orleans meeting.

He suggested that the best way to increase warehouse productivity is to increase that of the customer. The group has just completed a customer attitude survey, is considering operations research techniques to study areas where warehouses can help customers cut costs.

More Market Research — There'll be new emphasis on market research similar to the recent survey, which surprised almost everyone who makes or sells stainless steel. And, if some suggestions made at the convention are followed, there will be a serious effort to make salesmen more useful to the customer—and more profitable to the warehouseman. (Such a salesmen sells the same tonnage today as he did 10 years ago, but is paid twice as much).

Earnings Up—The final segment of Mr. Welch's presentation (men, markets and money) showed that average warehouse earnings—percentage return on net assets after taxes — have increased fourfold since 1954. They now equal that of the steel industry, 13.9 pct—expressed in both cases in terms of



book values, not actual higher replacements costs.

"Tight money" is forcing some buyers to ask for longer payment terms.

This means that warehouses, to carry these accounts, often have to go to the banks where, with their miserable '54 earnings picture they'd have been given the cold shoulder. On the basis of today's earnings, this trouble is minimized.

The Outlook—On the business outlook, predictions of a business drop range from about 15 pct for general line warehouses to upwards of 35 pct for smaller houses where cold-rolled coil constitutes a heavy portion of total business.

Inventory reductions are planned to continue in cold-rolled sheet,

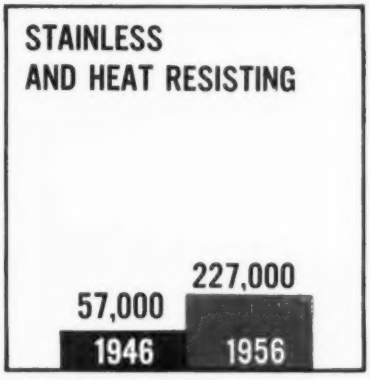
hot-rolled sheet, galvanized sheet, and hot-rolled strip. An attempt is being made to build up and balance light plate and structural stocks. Hot-rolled and cold-finished bar stocks are well balanced and future plans relate directly to sales in the immediate future.

Following is a brief rundown on product availability, as generally reported by steel warehouses:

Hot and cold-rolled sheet — A strong 120-day inventory, slightly heavier on cold-rolled. If anything is slightly scarce, it is very wide hot-rolled sheets.

Cold-finished bars — Despite a mild pickup in sales in the past two weeks, warehouses are watching their inventories carefully. Stocks are from 60 to 120 days.

Light structural and shapes — Demand continues strong. Inventories may run to 60 days, but these are unbalanced. Few can offer a complete range of sizes and shapes, and some sizes are completely out of stock. There has been a slight



buildup in the past two weeks, but this is negligible. Plates over ¼ in. and up to ½ in. continue tight in widths over 48 in.

Galvanized sheets — Inventories are up to 120 days and are being reduced by warehouses disappointed by spring sales.

Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept., THE IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

Canada Gets More Steel From Home

The past six years show a big jump in consumption of domestically-produced steel.

It indicates Canada is well along the road to a basically industrial economy.

■ Canada is moving closer to becoming a self-sufficient producer of steel. More than three-fourths of its rolling mill products are home-produced, compared to barely one-half in 1951.

While changes in overall economic activity are affecting the demand for steel, reports the Canadian Dept. of Trade and Commerce, the factor which has the greatest impact is the change in the rate of investment.

Production Increases—Most noticeable in the Canadian steel picture is the progress in plate, skelp, and hot-rolled sheet and strip production. Domestic output of plate and skelp accounted for only 45 pct of domestic consumption in 1951, the Department reports. By 1955, domestically produced plate had 75 pct of the market.

Similarly, domestic production of hot-rolled sheet and strip increased from 25 pct of the market in 1951 to more than 55 pct in 1955. The share of the Canadian market held by imported steel has also fallen in the case of billets, bars and rods, and cold-rolled sheet and strip.

Structurals Tight—Only heavy structurals continue to be a bottleneck north of the border. Responsible, says the Department, is "capacity limits on the production of larger type of structural steel." There was litle change in the domestic-import ratio from 1951 to 1955. In the latter year, Canada went outside its borders for 361,237 net tons of structurals, compared to 223,858 produced domestically.

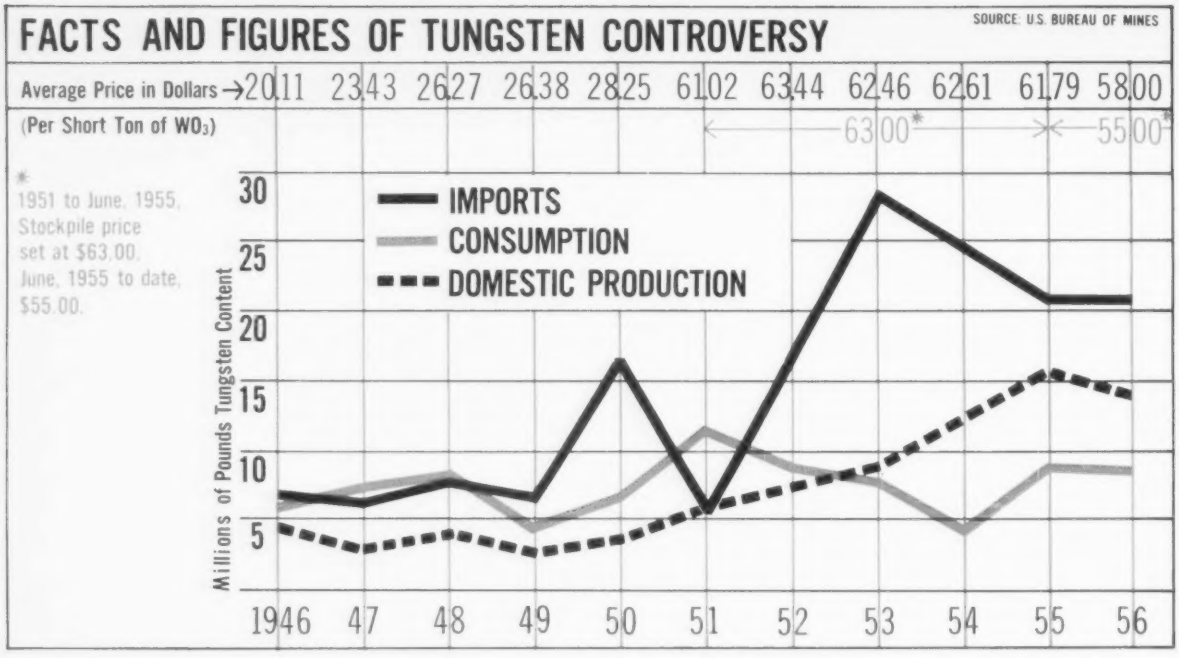
Rail Items Up—Only in the case of rails and track material was there an increase in the imports' share of the market. This was primarily the result of purchases of British materials for railway construction in British Columbia.

Bar and rod imports are important in British Columbia and Ontario, while all regions are about equally dependent on hot- and cold-rolled sheet and strip imports.

Canada: Imports Vs. Total Consumption

IMPORTS: (Net Tons 1955)	B. C.	PRAIRIES	ONTARIO	QUEBEC	ATLANTIC
Billets			1,114		
Structurals	59,890	43,937	130,393	113,605	13,412
Plates & Skelp	23,158	13,809	64,988	64,858	1,877
Rails	19,726	107	1,492	451	8
Track Material	3,459	90	598	61	520
Bars and Rods	12,107	1,468	52,146	14,308	724
H-R Sheet, Strip	13,649	15,517	143,343	42,363	2,763
C-R Sheet, Strip	790	1,298	62,120	13,822	502
Total Imports	138,763	79,282	474,112	256,272	21,299
Total Consumption	279,797	272,427	2,455,265	985,912	130,821

Source: Canadian Dept. of Trade and Commerce.


FACTS AND FIGURES OF TUNGSTEN CONTROVERSY
SOURCE: U.S. BUREAU OF MINES
Average Price in Dollars → 20.11 23.43 26.27 26.38 28.25 61.02 63.44 62.46 62.61 61.79 58.00
(Per Short Ton of WO3)
63.00*
55.00*
* 1951 to June, 1955, Stockpile price set at $63.00. June, 1955 to date, $55.00.
IMPORTS
CONSUMPTION
DOMESTIC PRODUCTION
Millions of Pounds Tungsten Content
30
25
20
15
10
5
1946 47 48 49 50 51 52 53 54 55 56

1956 — Estimate

Battle Looms Over Tungsten

Round 1 — Congress ignores Dept. of Interior request for more money to buy tungsten.

Round 2—Advocates say U. S. mines must be kept open, gear for last ditch stand.

▪ Is there enough tungsten in the stockpile?

Did Congress promise to sustain domestic tungsten mines, at least through 1958?

These two questions form the nub of a battle brewing in Congress over whether to continue government subsidy-purchases of domestic tungsten through fiscal 1957. The Dept. of Interior has been paying $55 per ton, well over the free-market price.

Enough Tungsten — Those opposed to the program insist there is enough tungsten in the stockpile. Estimates on how long the stockpile would last run as high as 26 years, at current rate of consumption. With that much in the kitty further support of the domestic industry would be a waste of money, they say.

Supporters, chiefly miners, place the stockpile at six years. They add that if the search for new industrial applications pans out, consumption could triple.

Congress Promised — But the main argument of producers, and their representatives in Congress, is that they went into the business, or expanded operations, on the basis of Congress' promise to buy their output. They say if the program is stopped now they will be left holding the bag.

One company has been importing tungsten concentrates for over 40 years. When Congress passed the domestic purchase bill in 1951, the company saw an opportunity to get into the domestic market, and invested heavily in mining facilities. If the program ends now this company's mines will have to close, and the company will take close to a $3 million loss, it says.

Lose Everything — Robert C. Armstrong, a small Nevada miner, says he sunk $90,000 into tungsten mining. He will be wiped out if the program goes under.

Tungsten Mining Corp., N. C., won't lose money on its investment, but says it will have to cutback mining, or even cease operations.

The opposition won the first round. Money for buying tungsten ran out in December 1956. Additional funds were asked in an urgent deficiency request, which included requests for funds for Dept. of Agriculture, Small Business Administration and such. The request was passed, but without money for tungsten.

Senate pros say the cons were able to drop the tungsten clause only because the bill reached the floor the day before Easter recess.

Philip M. McKenna, president, Kennametal, Inc., Latrobe, Pa., tungsten fabricator and producer, calls the tungsten defeat "a victory for good government."

But Charles H. Segerstrom, Jr., president, Nevada - Massachusetts

Co., oldest U. S. tungsten mining operation, says: "As a spokesman for the domestic tungsten industry, I can say, and with authority, that if no funds are appropriated, every tungsten mine in this country will be forced to shut down at once."

Next Step—Senatorial friends of mine operators have not conceded defeat. Sen. Haydn (D., Ariz.), chairman of the Senate Appropriations Committee, and several members—Senators Chavez (D., N. M.); Dirksen (R., Ill.); and Knowland (R., Calif.) will attempt to get money for tungsten in one of two ways:

(1) A rider on other urgent deficiency bills expected to come before the committee, or (2) through the regular Dept. of Interior fiscal 1958 appropriation bill, making it retroactive. But even if they accomplish this, they are still not out of the woods.

Future In Doubt — The appropriation for tungsten for fiscal 1958 in under heavy fire. And even if advocates of tungsten stockpiling can swing this, the program will end December 1958 unless they can get Congress to renew it.

The feeling is that the current situation is the crucial point. If they can not get money to carry the program until fiscal 1958, they stand little chance to swing the necessary appropriation through 1958.

U. S. Can't Compete — Most miners freely admit that when the government buying program ends it is the end of the line for them. They say they can't compete price-wise with imports because: (1) Biggest free-world tungsten producers are Korea, Bolivia, Portugal and Spain, where labor costs are lower, and (2) Domestic ore runs only a little over 2 pct metal maximum, while some foreign ores run as high as 27 pct metal.

A few producers are pinning their hopes on the fact that if domestic output is to be available in an emergency, mines must be subsidized and kept open now, despite a bulging stockpile.

Preparing Industry For Atom Attack

Companies are planning now to get production going after any enemy attack.

Making a corporate "last will" is one method to ensure there'll be continuity of management.

▪ Industry is giving serious thought and devoting serious planning to providing continuity of production in the event of an enemy attack on the U. S.

At a recent Business and Defense Services Administration conference, 38 executives discussed what has been done, what is being done, and what should be done to.

Survival Coordinators—The executives represented a large cross section of the nation's production system.

Almost all the companies declared they had named a top-echelon executive to coordinate and direct survival plans. Opinions differed, however, on whether plans should be written up. The danger in writing up: It could freeze plans and keep them static.

All but three firms had selected a nonvulnerable location to store vital corporate data. U. S. Steel pioneered this phase of corporate survival with the use of a worked out limestone mine.

Succession Provided—In providing succession of management in event of an emergency, most firms had plans for succession all the way through to the lower ranks of supervisory personnel.

Jones & Laughlin Steel Corp. has amended its corporate bylaws on the subject of what constitutes a quorum in the event of a national disaster.

"During an emergency period following a national catastrophe, due to enemy attack, a majority of the surviving members of the Board who have not been rendered incapable of acting due to physical or mental incapacity, or due to the difficulty of transportation to the place of the meeting, shall constitute a quorum for the purpose of filling vacancies in the Board of Directors . . ."

An Alternate - Alternate — J&L has designed two alternate employees for all posts down to the rank of general foreman. Among the top management group, thirteen men have been named as successors to the top man in the event he is killed. The highest ranking survivor in the group would take over the post.

The post-attack management of J&L would assemble at an alternate corporate headquarters following a disaster. In event this emergency headquarters was also in a disaster area, an "alternate-alternate" has already been selected.

At the Washington conference other matters considered were procedure for assessment of damage to facilities, provision of emergency financial procedures, dispersion of new production facilities, building whole plants underground, and transferring manufacturing to non-target areas.

New Reynolds Center

Reynolds Metals Co. has taken options on 55 acres near Louisville, Ky., with the intention of building a product research and development center and an office building.

The aluminum company has applied to the planning and zoning commission for rezoning of the site from residential to light business.

Yardstick for Executive Rating

Know Your Management's Abilities

Is it true that less is known about executive ability than any other segment of company personnel?

Chicago management firm suggests new tools of executive rating that could be of service to management.

▪ A topflight consultant charges: "There's probably less known about executives and their place on the company team than any other phase of company life."

Management consultants are adapting two new tools that will at least ease the problem. John A. Patton Management Engineers has evolved a formalized plan for executive job evaluation.

It's designed to rate the job, give it a point rating based on 17 factors. The final rating is established by a committee consisting of the management consultant, the job holder in the position being rated, and his superior company officer, perhaps other company officials as well.

Makes Sense—Point valuations vary with the company. But with a 400 company sample already complete, Patton is coming up with this conclusion. Salaries can be correlated to the job point rating. Salary ranges comparable with companies of like size, output, and sales gross can be established.

In a test case that will probably become a classic, a manufacturer of a fitting used in the aircraft and home heating industries decided his sales manager wasn't putting out.

Yardstick Needed — The president had no executive job standards. He simply felt he should be getting 15 pct more sales. The sales manager's job was evaluated. He rated an excellent man in an unusually tough job.

Positive Results—The president, faced with a third party who guaranteed his sales manager was equal to the job, agreed to sit down and to establish a realistic job standard for the selling job. It was agreed that, in a growing market, if the sales chief held 25 pct of the total market, this was goal enough.

A definite performance standard for the sales manager position was worked out, based on the carefully examined requirements of the job itself. It worked. In two years the company has grown from 200 to 350 employees, has moved up to command 30 pct of the market.

In this case, job analysis was later applied to production, plant superintendent, and controller positions with positive results in all three.

Next Steps—The first approach: analysis of the executive's job. The second approach and one that will be backed by considerable new data at mid-year: testing and evaluation of individuals occupying specific jobs. Science Research Associates is profiling men who've made the grade in four general executive categories: company presidents, controllers, sales managers, and production heads.

Promotion May Be Good for You

Condition Good — Bosses don't die young. The old belief that promotion can kill you is challenged by a new American Management Assn. study on executive health. Industrial physicians find no evidence that executives are in any worse shape than other employees.

In fact, they may be better off. National Office of Vital Statistics figures show that men of managerial, technical and administrative level have lower than average mortality rates. And life insurance companies give lowest premium rates to executives.

Top Level Problem — A new study by Life Extension Examiners of 5000 executives of all ages from 30 companies finds 58.9 pct of executives in good shape and 41.9 pct substandard.

Executive health is a major concern to the corporations they work for. Many companies now run periodic health checks for executives as well as rank-and-file workers. Of companies replying to AMA's survey, 70 pct require physicals of executive job applicants before hiring, although only 53 pct offer exams to the brass on the job.

Neuroses Spread—Should exams be compulsory: Factually, 56 of the replying companies require them, 132 urge them, and 40 leave them entirely voluntary.

Emotional problems show up frequently. But there is argument if executives are more neurotic than others. Many doctors believe that when an executive has serious emotional problems, his subordinates also are likely to develop problems. And the higher up the ladder the neurosis is located, the more likely it is to spread—and the more detrimental to the company.

WAR GAMES: AMA President Lawrence A. Appley watches as team of presidents plots strategy. Left to right: John D. Gray, Wallachs, Inc.; Don G. Mitchell, Sylvania Electric Products; Alfred J. Marrow, Harwood Manufacturing Corp.; William T. Brightman, Jr., Blackstone Mutual Insurance Co. It was first public play of Top Management Decision Game, a business war game for executive training.

Management Game Trains Execs

New mathematical mockup offers a painless way to get corporate practice.

It pits teams against each other in struggle to achieve market success.

▪ An executive suite version of Monopoly may be claiming the attention of more and more management men if the American Management Assn. has its way.

Named Top Management Decision Game, the new device has two very serious purposes: giving presidents and would-be presidents practice in making corporate decisions and showing lower-level brass how various factors interact and must be weighed against each other when forming company policy.

First regular use of the new device will come this summer as part of the program at AMA's new Academy for Advanced Management at Saranac Lake, N. Y.

Simulates Business World—Prime idea behind the game is simulating mathematically the business world. Using a group of cause and effect formulas, the model determines the interactions of the decisions made by the five teams playing the game.

The model has been coded into an IBM computer, which acts as official scorekeeper. Thanks to the computer's speed in figuring the results of play, a few hours of gaming can simulate years of experience.

Decisions, Decisions—When demonstrated recently to the press, twenty company presidents took part in competing, divided into 5 teams. Each team represented a company in a hypothetical industry. At the beginning each team was given a combined balance sheet and a statement of operating data for that industry. Then, on the basis of the data, they were required to decide what funds to allocate to the vital areas of production, marketing, research and development, market research and plant expansion. Players also set market price, were allowed to raise cash by selling plant. Results were fed into the computer which compared strategies of the five teams against the model, sent out results and hence new problems for the subsequent quarter. A prime role of the game is stressing that no business functions in a vacuum, that any strategy interrelates with the strategies of the competitors.

The business world in which the game operates is an arbitrary one. It is true to life in the sense that spending money produces the same effect it does in real business. Thus, other things being equal, more advertising sells more goods; higher output is more efficient output; more research and development sells more products by improving them and also reduces the cost of production.

Factors Omitted—These formulas are all familiar and based on the principles of classical economics. But to keep the game manageable, many factors that play important roles in real business have been omitted. AMA indicates that variable for omitted factors can be introduced into the model if the additional complication is really wanted.

Other Games Planned—The management association is already planning other business games.

Ceramics' Role in Jet Age Grows

Heat Resisting Qualities a Big Asset

With new jet planes leaving the sound barrier at the post, better heatproof materials are needed.

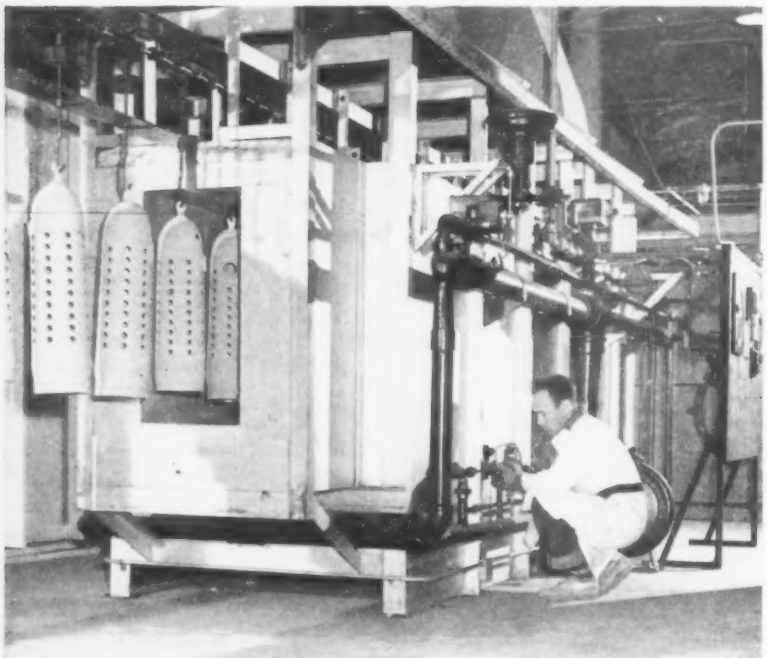
Ceramics are headed for a major role in this area. They will be used to coat superalloys.

▪ Growing use of high temperature ceramic coatings in aircraft is widening markets for the porcelain enamel industry.

Most military jets in use today have high temperature ceramics at work in their engines. And many commercial planes are using the material in exhaust systems — including the Boeing Stratocruiser, Convair 240, Douglas DC-6, and Fairchild's "Flying Boxcar."

Extends Protection — Ceramics are joining with superalloys to give the jet air age protection from heat, friction, and corrosion. While supersonic aircraft stayed at speeds below 1500 mph, ceramics were considered a competitor to metals such as molybdenum, titanium, cobalt, and reinforced alloys. A thin ceramic coating over stainless steel, for instance, can offer sustained protection from temperatures up to 1600 F., according to ceramics people.

But with new jet planes being designed to travel at speeds beyond 3000 mph, heat protection in components will have to be doubled. High temperature ceramic coatings in combination with superalloys offer great potential; especially in combustion chambers, nozzle vanes, and afterburners.



BAKED-ON PROTECTION: New mass production furnace at Solar Aircraft Co., San Diego, fuses high temperature ceramic frit to jet engine combustion chambers. Parts can withstand heat up to 2000°F.

A Leader Reports — The high temperature ceramic A-418, developed by the National Bureau of Standards, is the most popular. It is described as a "highly refractory porcelain enamel with the same coefficient of expansion as stainless steel."

Bettinger Corp., Waltham, Mass., a leader in the high temperature ceramics field, says its flight tests are proving successful. In one instance, a Constellation equipped with ceramic-coated collector rings checked out at 3000 hours with little wear to speak of. With conventional uncoated rings, replacement was required every 1000 hours.

Better Frits Coming — Another technical breakthrough for ceramic coatings is on brake linings for aircraft wheels. The coatings can be made to have a high coefficient of friction. Yet they will resist the tremendous heat and wear imposed upon surfaces which are in contact while moving at high speed.

According to the Porcelain Enamel Institute, improved coatings are under development by private research laboratories, coating concerns and frit producers. Another possibility for porcelain enamelers: a high temperature ceramic coating for aircraft and rocket "skins" to give added protection from friction at high speeds.

Other Uses—While deepest inroads to date are in the aircraft industry, headway in ceramic coatings also is reported in industrial applications, automotive and appliances.

Ceramic-lined smoke stacks are gaining in popularity, P.E.I. reports. Installation and maintenance costs are low and stack life is extended from 3 to 5 times, claims one large producer. Ceramic coat-

ings are finding uses in heat exchangers and in industrial piping where highly corrosive conditions exist.

One truck producer, taking a page from the aircraft industry's book, has been using ceramic coatings on its mufflers and exhaust pipes for several years. In such applications, ceramics can be applied over mild steels.

Handling Molten Metal—In the appliances field, some producers are using ceramics in stove burner grids and in space heater heat-exchange units.

One unique use of ceramic coatings, reports E. A. Douglas of Bettinger Corp., is for coating metal baskets, jigs and fixtures for use in lead or zinc melting pots. "The coating is unaffected by the molten metal, but the important point is that the metal will not stick to the coating even when it solidifies," Mr. Douglas says.

Some success has also been achieved by coating pieces used for brazing parts together. These parts are prevented from sticking to the jigs.

Resists Thermal Shock — Another application is in exhaust pipes for boats. "Ceramic coated-pipes . . . resist the thermal shock conditions of a hot pipe running in cold sea water, and also the corrosive conditions of the sea water itself," he adds.

The electrical resistance of ceramic coatings becomes important where high temperatures are involved. Motor parts, transistor caps and other electronic parts can be coated and made operative at temperatures higher than 600 F. without trouble.

Philco in Calif.

The Government and Industrial Div., Philco Corp., has opened a new development laboratory at Redwood City, Calif.

Henry F. Argento, company vice president in charge of this division, said this was the first step in a West Coast expansion program.

HENRY W. DIETERT: New president of American Foundrymen's Society.

L. H. DURDIN: Vice president of Foundrymen for 1957.

Casting Design Draws Buyer Interest

Foundrymen's Society's first Engineered Castings Show outdraws best predictions.

Buyers of castings show new interest in latest foundry design developments.

▪ This year's Engineered Castings Show, sponsored by the American Foundrymen's Society, is a first of its kind. From the early stages of planning, the idea was to emphasize casting design. The new show did just that.

Most of the exhibitors were foundries showing their wares. Interest was aimed at the customer in the market for castings. The makers of core dryers, shake-outs, and most of the rest of the foundry equipment suppliers were intentionally left out.

Single Theme—Decision to run a "single theme" show makes a lot of sense. For one thing it was the approach design engineers voted for in a previous survey made by the Gray Iron Founders' Society to determine show preference.

New Developments—From the standpoint of the potential buyer of castings, many of the exhibits were impressive. There was a lot of variety in sizes, shapes, section thicknesses, and relative complexity of design. The buyer was shown that many of casting's previous restrictions have been discarded; that casting can be readily adapted to a wide range of designs and industrial applications.

The importance of product appearance was also stressed. In many consumer products where eye appeal counts, the simply designed casting far outshone the gingerbread fabricated weldment.

Interest High—The design theme appeared to be a move in the right direction in stimulating interest. Registered attendance was well over 5000; 3500 was forecast.

Add Depth To Your Bargaining

Shock Troops Are Negotiating Aid

Industrial relations associations, strong on facts and bargaining experience, can supplement company forces.

They are handy aid in negotiations, arbitration and general labor relations.

▪ Industrial management men are discovering the advantages of a new technique in labor negotiating—bargaining in depth.

With the use of industrial relations associations, closely familiar with the issues involved, firms large or small are able to have shock troops at the bargaining table.

Tapping The Pool—It's a handy aid providing member firms with access to a potent fact-filled reservoir of bargaining facts on wages, hours, working conditions and other information.

The industrial relations association also stands ready to actually represent associated firms in negotiations, provide information on labor contracts or trends, handle arbitration cases, or provide any of the services needed for today's complex labor relations.

Firms using an association's services get regular briefing on wages, fringe benefits, and developments in the labor relations field. Allied information is available from thousands of filed contracts telling what other firms are doing in areas ranging from termination pay scales to the handling of personal calls.

A leading example is Associated Industries of Cleveland. This nonprofit industrial relations organization represents 600 firms in northeastern Ohio.

Fingertip Facts — The group's member companies represent about 60 pct of the total manufacturing work force in Cleveland. It is one of the oldest and most active of its kind in the country. But most large industrial areas have counterparts.

The Cleveland group has two full-time negotiators, who have at their fingertips information from contracts in the area to match against the union array of statistical and other data. AIC has represented a rapidly growing number of member companies at the bargaining table. This year it will negotiate for about 200.

Good Relations Maintained—There is evidence of AIC's sound relationships with labor and the community. Cleveland labor leaders regard AIC as a hard "but reasonable" bargainer in labor negotiations.

In addition to its work in labor-management contract negotiations, AIC's staff also serves as industry spokesman in arbitration cases, NLRB hearings, or before the Wages and Hours Commission of the Dept. of Labor, or other agencies of the government, both state and federal.

Know Your Arbitrator—It also keeps records of decisions of all known arbitrators in the Midwest. These are a guide to selection when a company must give approval of an arbitrator to hear its case.

What does it cost? AIC's dues are based on employment. Members pay $1.80 per year per employee, with a minimum of $50 and a maximum of $2,800. Head of AIC is Ben F. McClancy, secretary and general manager.

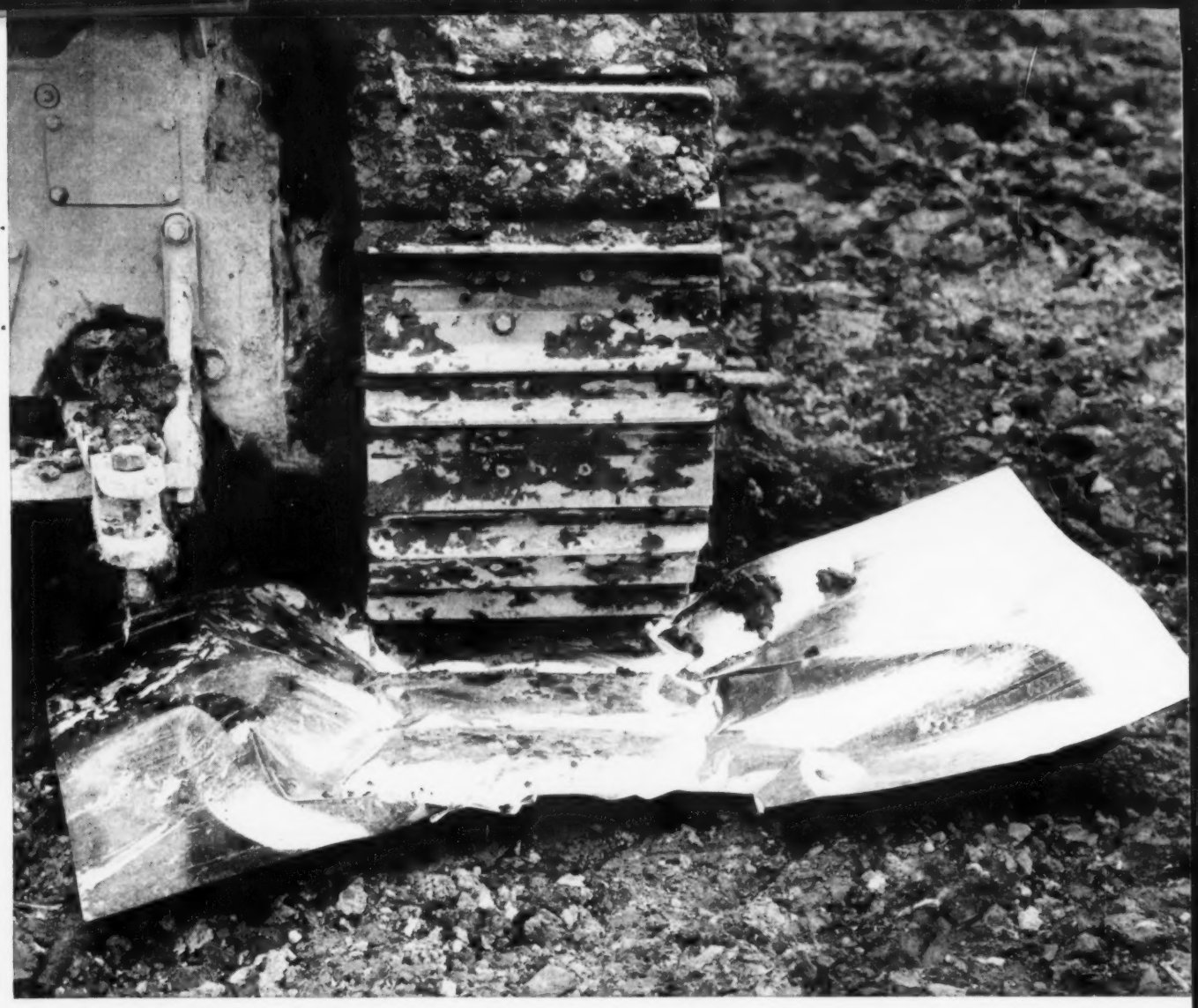
Appraising Labor Contract Trends—

▪ AIC keeps files of labor management contracts in the Cleveland area. This provides a constant briefing for member companies for an accurate appraisal of latest trends in labor contracts.

Summary of 59 wage settlements in Cleveland area, Jan. 1, 1957 through April:

Increase Cents per Hour	Number of Companies	Number of Employees
0	1	50
3.0	4	300
4.0	1	19
5.0	10	742
6.0	12	2,624
6.3	1	185
7.0	7	1,388
8.0	7	1,513
8.5	2	1,216
9.0	2	256
9.2	1	511
9.5	2	128
10.0	7	432
11.5	1	117
13.0	1	313

Weighted Average Increase—$.0732



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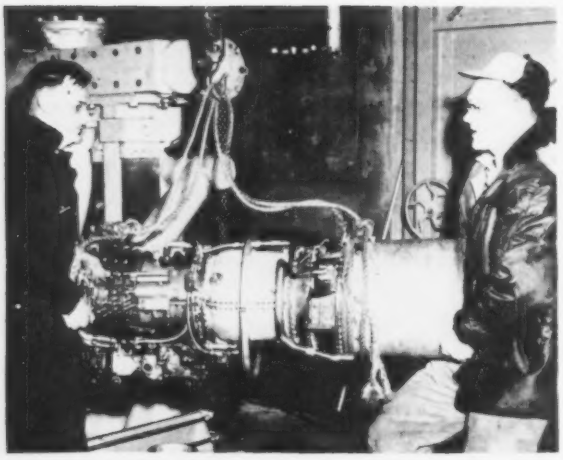

AIR COOLED: The question: How will General Electric's T58 aircraft gas turbine perform in extreme cold. The solution: Air Force Site on Mt. Washington, N. H. The 325-lb, 1000-hp engine, in a test rig (left), in the mountain top headquarters (right), performed "satisfactorily" at 20 degrees below zero.

Double Vacuum Melting

Crucible Steel Co., Pittsburgh, will spend $1.5 million to expand Vacuum Metals Corp., an operating division of its Sanderson-Halcomb Works, Syracuse, N. Y.

The program is aimed at doubling the company's capacity for turning out high purity, vacuum melted material.

Included in the project are construction of a new vacuum induction furnace capable of producing 3000-lb ingots, a new melt shop building, and a new metallurgical-chemical laboratory. Construction is scheduled for completion by the end of the year.

Carpenter, Porter Bid For Northeastern

Carpenter Steel Co. is negotiating for control of Northeastern Steel Corp., Bridgeport, Conn., now in receivership. No details were given, but J. William Hope, Northeastern Steel trustee, said the trustees of the firm are giving the Carpenter proposal serious study.

Earlier reports that H. K. Porter Co., Inc., was negotiating for the company have been confirmed. But Porter spokesmen refused further comment. Mr. Hope said, Porter proposals have been made to the directors of Northeastern, not the trustees.

Status Debated—The Porter proposals assumed Northeastern would be moved from chapter 10 to chapter 11 of the Bankruptcy Act. Trustees see no sign the courts will countenance such a move. Under chapter 11, the debtor company is allowed to deal directly with creditors. Under chapter 10, the more usual arrangement, trustees handle all affairs of the company.

More Cast Iron Use Seen for Autos

The amount of aluminum and other light metals used in cars will increase greatly over the next few years. But at the same time cast iron will be needed in even greater quantities. This is the opinion of H. F. Barr, chief engineer for Chevrolet.

Mr. Barr says that the increased rate of car and truck production in the years ahead is one reason why there will be a greater need for cast.

Iron's Advantages—While light metals do have weight saving and other advantages, he says, iron will continue to be used because of its superior damping qualities and low thermal expansion.

Mr. Barr admits that Chevrolet is currently experimenting with aluminum cylinder blocks. He says that there are many economic factors that may hold back volume production of the units but that their use will save 75 lb of weight per engine.

Experiments Go On—"When a practical aluminum block is developed, we can look for a new specific output of 1 hp per lb of engine weight."

Chevrolet is continuing its experiments with gas turbine and free piston engines, but Mr. Barr says that it looks like the conventional piston engine will continue to be popular for a long time to come.

Contract for Venezuela

Loftus Engineering Corp., Pittsburgh, will design, construct and install four basic openhearth furnaces, four 2-hole batteries of ingot heating furnaces and special related equipment for Innocenti Corp. of Italy, in Venezuela.

Openhearths will be stationary type, fuel oil or gas fired, with a capacity of 250 metric tons each.

Each hole in the ingot heating furnaces will have a capacity of 125 metric tons. The furnaces will have automatic controls.

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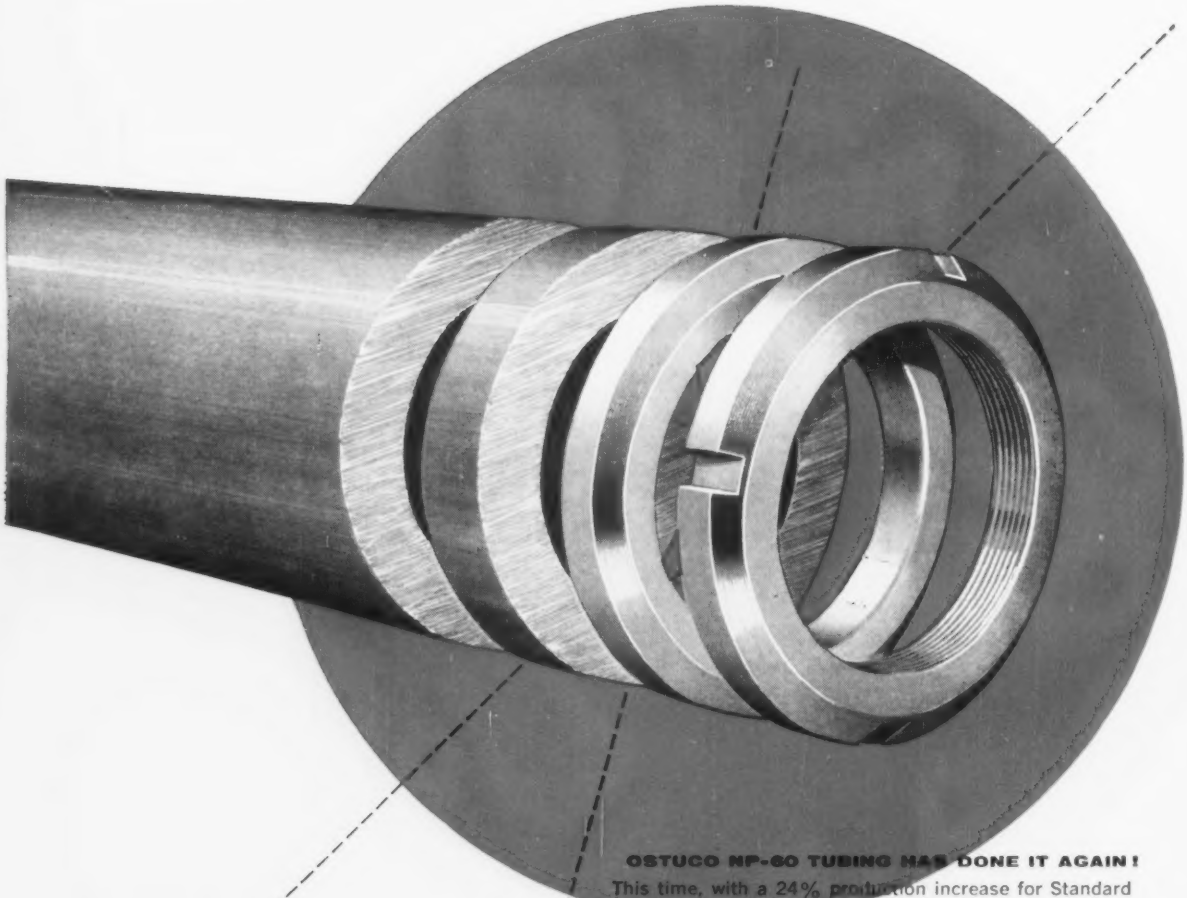

24% Production increase at Standard Locknut & Lockwasher, Inc. after switching to OSTUCO NP-60 tubing

OSTUCO NP-60 TUBING HAS DONE IT AGAIN!

This time, with a 24% production increase for Standard Locknut and Lockwasher, Inc., Indianapolis, Indiana. Tubing experts from OSTUCO recently recommended a switch to NP-60 Tubing specially processed for machineability for Standard's locknut and lockwasher line used in ball and roller bearing applications.

Standard components find their way into electric motors, machine tools, automotive, aircraft, farm and construction equipment. Other companies, with equally diverse applications, report similar success with NP-60. If you are machining bearings, washers, collars, or any circular part, you'll do well to check into the merits of OSTUCO's new NP-60 seamless steel tubing.

GET NP-60 WITH "SINGLE-SOURCE SERVICE."

New NP-60 seamless tubing comes to you with OSTUCO'S unique "Single-Source Service"—experience and facilities for design and development, production and delivery all under one roof. Get together with a tubing expert for preliminary planning on NP-60's possibilities in your product. Contact your nearest sales office or write direct to the factory.

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Richard W. Banfield

A New Approach to Retooling

Machine tools are being improved so rapidly obsolescence may be expected in less than 10 years.

Mr. Banfield is stumping for a new management attitude toward tool replacement.

The emphasis, he says, should be on cost-cutting rather than metal-cutting.

Richard W. Banfield: The cost of failure to modernize is high.

■ When a company starts asking, "When should we start to re-equip," the answer, according to Richard W. Banfield is: "You should have started yesterday." The fact that Dick Banfield is president of Motch & Merryweather Machinery Co. and is interested in selling machine tools might color his thinking, you might say. But once heard, his pitch for retooling is undeniably sound.

A straightforward approach to the problems of depreciation, replacement, and taxes accounts for his appointment to such posts as chairman of the tax committee, National Machine Tool Builders Assn.; member of the board of governors, Metal Cutting Institute; and chairman, tax committee, Manufacturers Assn. of Connecticut. It has also made him a much-sought-after forum speaker.

Serves Apprenticeship — Mr. Banfield, now 45, whetted his interest in the machine tool business as the son of one of the country's foremost authorities on textile manufacturing. After graduating from Dartmouth College (where he was an All-American swimmer) in 1934, he served an apprenticeship with Niles-Bement-Pond Co.

During that time, he learned to appreciate the problems of the men at the machines. Later, as a N-B-P executive, he also learned the problems of those whose job it is to buy new machines.

Concentrate On Costs — "Although production men call a machine tool a metal-cutting tool, it really ought to be called a cost-cutting machine," he says. "Just as the whole mechanism of the machine tool is concentrated on the cutting tool itself, I feel that management's attitude toward re-equipment should be concentrated upon the cost-cutting factors."

The cost of a new machine, he says, should be weighed against the annual savings it can effect and the amount recoverable through accelerated depreciation in the first half of the machine's tax life.

Offers Expansion Alternative — Re-equipment comes into the expansion picture here, too. Expensive building costs, he says, can sometimes be avoided and the problem of plant space solved by a program of equipment modernization. Mr. Banfield's replacement philosophy is a remedy for a surprisingly large number of management ills.

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...its effect on modern equipment

Sanitation . . . easy maintenance . . . inherent cleanliness . . . ready adaptability to a host of different shapes and forms—these are a few of the reasons why more and more designers of food processing, dairy and beverage equipment specify stainless steel.

You'll find it in tubing, tanks, bulk coolers, autoclaves and dozens of other vital pieces of equipment in many different industries.

Stainless steel's superior resistance to corrosion . . . ready availability in scores of work-saving standard shapes adaptable to many needs . . . ease of machining, forming, joining and casting combine to give equipment producers greater freedom of design.

For more information about stainless steel and its growing effect on equipment design and selling problems, see your stainless steel supplier or write ELECTROMET—leading producer of more than 100 alloys for the metal industries, including chromium and manganese used for making stainless steels.

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How Your Workforce Is Changing

Most of the gains in manufacturing employment have occurred in non-productive personnel.

This industry-wide shift could mean broad changes in industrial relations practices.

■ Significant changes are occurring, or have occurred, in the makeup of your company personnel. It's possible that the shift in work force may result in broad changes in your company's entire industrial relations program.

The big change is the tremendous increase in non-production personnel, as contrasted to the comparatively low increase in production workers. The increase in total employment combined with the gains in power of organized labor, chiefly in production personnel, tend to obscure this trend.

Proportion Changes — The fact is, according to Labor Dept. figures, during the 1947-56 period the number of production workers in manufacturing rose only 380,000, or about 3 pct. At the same time, the much smaller group of non-production workers increased by 1.2 million, or about 50 pct.

The ratio of non-production to production workers is now a fat 22 pct, compared with 16.3 pct ten years ago.

Significance to Labor—This is one of the basic reasons for labor's determination to win the white collar worker, as illustrated by the drives now being organized in labor's major unions.

While big gains are still to be made in the production ranks, the importance of the non-production worker is growing. Unless labor can make gains here, its importance, particularly in the industrial unions of the CIO, is apt to diminish.

. . . Where Changes Take Place

What's Going On—It's important to recognize how this change in personnel is taking place. It may be surprising that the obvious assumption of technological improvements and increased productivity isn't the entire answer.

Research and development personnel have achieved great numerical gains. Another important factor is what the Dept. of Labor calls "overhead functions."

New Fields Added—These comparatively new functions include employee counseling, safety education, credit unions, suggestion awards, retirement and supplemental benefits programs, grievance handling, and the other incidental functions of labor relations, to name a few. Ten years ago you scarcely heard of them. Now they are big departments.

Increasing complexity of administering a modern company has led to expansion of many administrative departments and functions.

Productivity Gains—Productivity, however, is the key reason for the marked change in personnel. Statistics show that the greatest increases in non-production vs. production workers have occurred in the industries which invested most heavily in new plants and equipment in the past decade.

According to Bureau of Labor Statistics, the increase in worker productivity is estimated at 36 pct between 1947 and 1956. This has made possible a 43 pct gain in manufacturing output with a 3 pct increase in production worker employment and a 2 pct increase in hours.

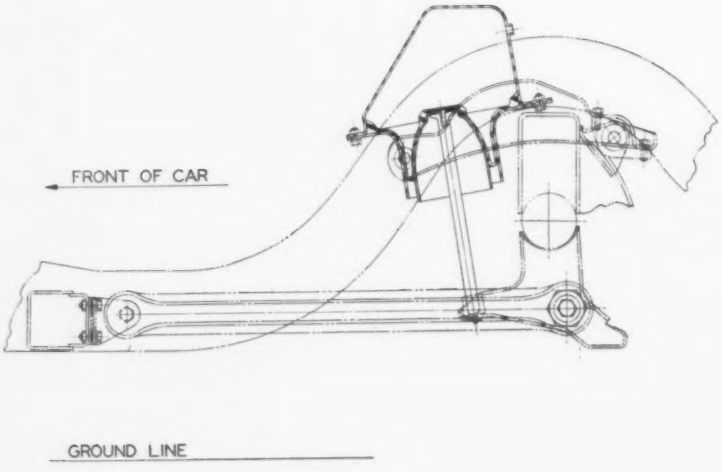
One thing to think about: Office automation is just getting under way. If this has the effect of increasing office worker productivity as has plant automation, the trend could be somewhat reversed, although this is looking quite far in the future.

More Hope for Tax Cuts

Earnings High—Industry's first quarter reports, which showed generally satisfactory earnings, will give a strong push to some tax relief this year.

It's frequently overlooked that a balanced budget depends on a continued high level of business—and resulting high tax receipts. Even if a budget surplus does occur, any tax cut will have to be based on the assumption of a continued good rate of business.

It's been stated that a surplus of $2 billion to $2.5 billion is necessary for a tax cut of any significance. If business continues at its present rate, tax receipts should result in a budget surplus at least equal to that figure.



REAR SUSPENSION

ON AIR: Diagram at left shows rear air suspension. Exploded view of parts shows dome, diaphragm, retaining plate and piston and other parts, indicating how mechanism operates. Unofficial estimate of cost. Optional at about $150.

Air Suspension Ready for Debut

Two and possibly three automakers will have air-suspended frames on next year's models.

It licks many problems that cropped up because of lower body designs.—By T. L. Carry.

■ Air suspension will probably be one of the most significant engineering advances to appear on the 1958 cars. This is the consensus of industry observers who have had an opportunity to study the system on Cadillac's present Brougham.

It's no secret that at least two big producers will have air suspension on their 1958 cars and that a third is considering introducing it as optional equipment. At the same time, every company in the industry is working on the problem. This includes Chrysler Corp. which only this year introduced torsion bars as front suspension units.

Solves Low Problems—Its eventual adoption by the entire industry will not be accidental. The increasing emphasis on cars with lower silhouettes makes air suspension almost inevitable. For example, when three or more people sit in one of today's cars, it practically scrapes bottom. In addition to ground clearance problems, such autos do not present a pleasing appearance on the road.

With air suspension, such a situation does not occur because the car's height remains constant regardless of the load.

How Does it Work?—On the Brougham, the system consists of four air spring assemblies which replace the conventional springs at each of the car's wheels. Major components of the assembly are a dome, rubber diaphragm, retaining plate and piston. The piston and rubber diaphragm fit into the dome which is secured to the frame. It is the air in the dome acting on the diaphragm which is the spring.

Three levelling valves, one at each rear spring and one which controls both front units, meter the flow of air to each spring assembly.

Levelling Speed Varies—There is a solenoid package consisting of two pairs of valves. One set blocks out the flow of air for parking and the other meters the air for either fast or slow levelling. Rapid levelling is used when the passenger load changes and slow levelling is employed when the car is operating over the road.

The system also uses a small air compressor and an air storage tank. The compressor is powered by an integral electric motor and is mounted on top of the car's generator. A limit switch maintains air pressure between 100 and 120 lb psi in the storage tank which is located just in front of the car's radiator.

Passes the Test—These components, along with 40 ft of copper

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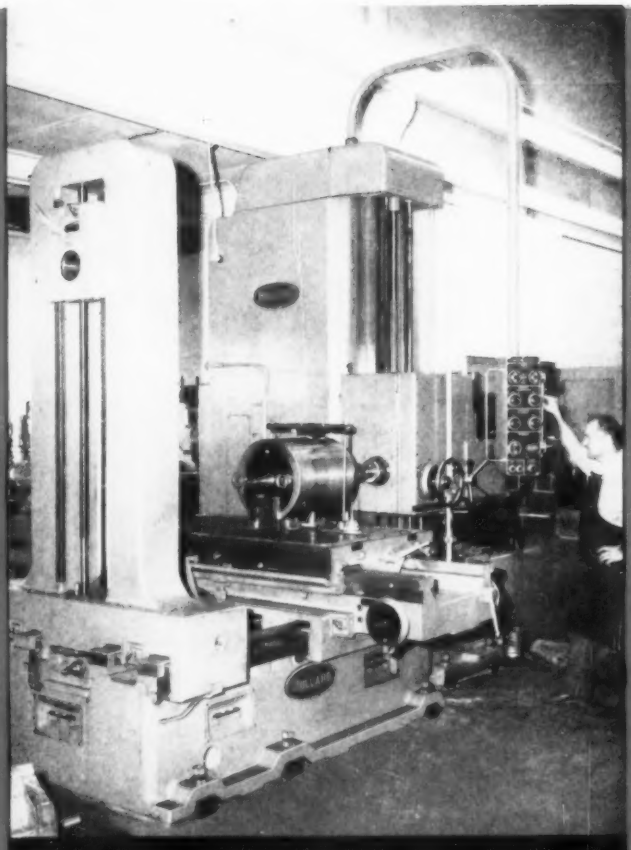
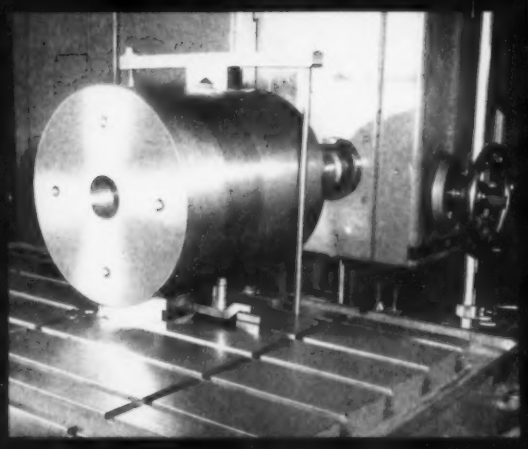
So says Mr. Arthur D. McDonald, President of E & M Enterprises, Inc. of Middleport, New York, builders of special machinery and tools for industry.

"There is no comparison" continues Mr. McDonald, "between our previous boring mill and the Bullard Model 75 — it is more accurate, faster, has more capacity, is simple to operate, has greater rigidity — all of which add up to more weekly production of . . . precision parts". . .





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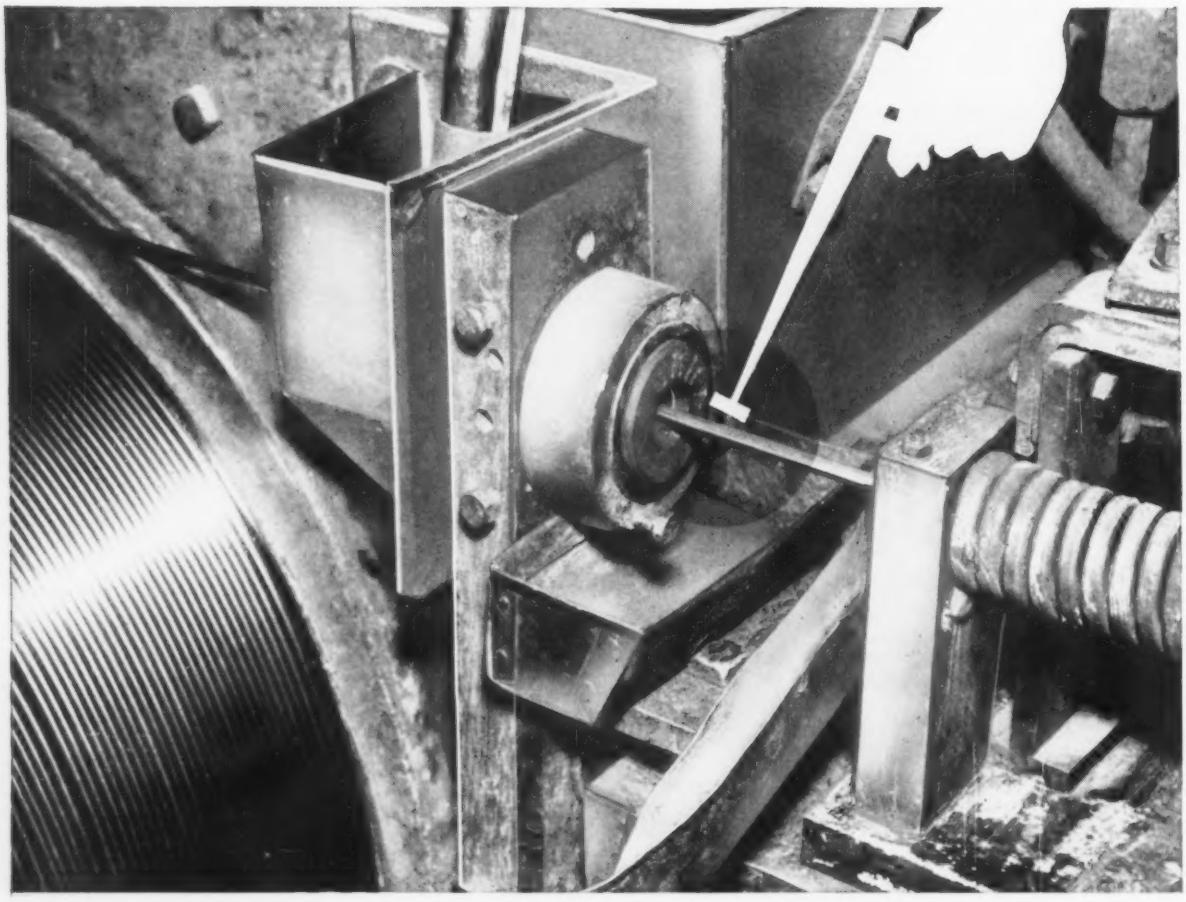

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Automotive Production

WEEK ENDING	CARS	TRUCKS
May 11, 1957	126,421*	23,268*
May 4, 1957	119,999	28,849
May 12, 1957	105,552	22,121
May 5, 1956	112,705	22,688
TO DATE 1957	2,536,900	417,900
TO DATE 1956	2,487,300	452,300

*Estimated. Source: *Ward's Reports*

tubing, comprise the whole system. It is a relatively simple device, and it performs well.

In tests over a bumpy stretch of road the Brougham's ride is far superior to a conventional Cadillac's. It absorbs ordinary bumps easily and even big chuckholes are managed with very little strain at 50 mph.

Little Weight Change — Altogether, the air suspension system weighs 35 lb more than conventional springing. At the same time it replaces 91 lb of spring steel in the Cadillac. Although the amount of spring steel used has been greatly reduced, the net loss in the Brougham is relatively small. Adoption of air suspension makes it necessary to redesign the rear end of the car and much of the weight lost in the springs is replaced in other components.

One Pittsburgh steel spring producer estimates that air suspensions will make a 10-15 pct dent in the steel auto spring market. But he doesn't feel steel springs will be shoved out of the market. The reason: Air springs have cost and space disadvantages.

Control Problem Licked—They are a drag on the motor, he claims. They require a compressor, tubing and valves. Also, in air suspension systems under development, steel springs still are expected to play a part—although less important than in present designs. For independent rear wheel suspension systems, use of coil springs, leaf springs, or air cylinders are all possibilities.

The steelman confirmed the fact that cylinders will be offered on General Motors cars. They will be optional equipment, he said, costing about $150 extra. He said Ford might also offer air suspension.

Cadillac's biggest problem in adopting air suspension was obtaining a soft ride with the proper amount of control. Although General Motors has had a lot of experience with air suspension in buses and trucks, Cadillac found that this was not practical for use in cars.

Shortcomings Denied—The company needed a more rapid rate of change and a faster recovery in its springing than that available in the truck system. The solution to the problem was in the shape of the spring assemblies. Proper shaping of the parts restraining the rubber diaphragm gives the desirable variable rates.

There have been reports that, if the system springs a leak, it's impossible to open the car door at the curb or to get a jack under the car. Cadillac says this is not so. If a leak did develop, the car would simply sink to the bumper stops on the frame and it could still be operated.

No Leaks Yet — Actually, production of the Brougham has been so limited—about 100 a month—that Cadillac has had no experience with leaks of any kind. At the same time, the company has had so much experience with air conditioning units that it is doubtful if leakage will ever be a problem. In addition to using "O" rings at all tube joints, the division tests for aid leaks with the same equipment it uses to find freon leaks in its air conditioners.

Although air suspension looks like the automobile suspension of the future, it is important to keep in mind that its introduction in the industry will be gradual.

Cost Is Undecided — Like most innovations, it is likely to be introduced first on high priced cars and then made available as an option to the rest of the industry.

However, air suspension is likely to follow the same pattern as other innovations such as power steering and power brakes. Its price will undoubtedly come down as its use is more widely accepted. Car buyers will decide that in 1958.

THE BULL OF THE WOODS By J. R. Williams

PUTTIN' ME ON THAT THING, RUN BY GADGETS AN' BUTTONS? WHAT GOOD IS ALL MY KNOWLEDGE OF TH' MACHINIST TRADE GONNA DO ON THAT SLOT MACHINE?
WHAT GOOD IS ALL YOUR KNOWLEDGE OF BASEBALL DOIN' YOU NOW? YOU COULDN'T MAKE FIRST BASE ON A LOST BALL?
THEY TAKE TO NEW THINGS SLOW--HE HAD A HANDLEBAR MOUSTACHE WHEN HE WAS HAULED OFF THE BALL FIELD!
THE REBEL YELL
J.R.WILLIAMS

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You'll want to know why the No. 0 . . . one of six sizes of Cincinnati's line of standard Centerless Grinders . . . does such a fine job of grinding small parts. Spindle bearings are the exclusive FILMATIC type that never wear out; lubrication is automatic; regulating wheel speeds are infinitely variable; 5 hp drive; readily automated. Capacity: up to ½" diameter. Want more information? Look in Sweet's Machine Tool File, or write for a copy of catalog No. G-640-1.

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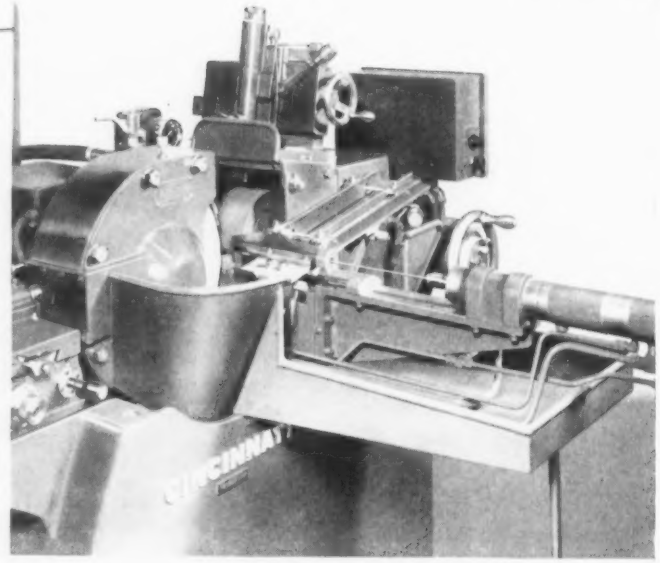

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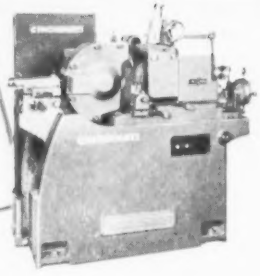

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Labor Takes Aim at McClellan

His Probe Generates Too Much Heat

AFL-CIO cheered the "get Beck" show. Fear now is that investigation may broaden.

Move to push Sen. Kennedy forecasts alliance in 1960 if he makes presidential move.—By G. H. Baker.

▪ Labor union chiefs are trying to foment a political revolt against Senator McClellan, D., Ark., the chairman of the Senate committee investigating racketeering in unions and in management. But most senators doubt a "dump McClellan" drive can be put over at this time.

McClellan has been a thorn in the side of union officials from the start of the present investigation. Although the top AFL-CIO hierarchy welcomed the "get Beck" campaign, they now secretly fear the investigation may not stop with him. So they'd like to see McClellan unseated as chairman of the committee before he starts investigating other unions.

Who's for Kennedy—Top union command wants to see McClellan replaced by Senator Kennedy, D., Mass., an avowed "friend" of labor. Kennedy is particularly partial to Walter Reuther, United Auto Workers president and AFL-CIO vice president.

If Kennedy does succeed McClellan as chairman of the Senate investigating committee, you can expect some fast changes in the committee's policies. First, all criticism of Walter Reuther would stop. The "get Beck" move would be rammed through to a successful conclusion. Then, Reuther lieutenants would move to take over the Teamsters.

Looking to 1960—Reuther admits he fairly itches to take over the Teamsters Union from Beck. It would increase his personal prestige enormously, and would add substantial revenues to AFL-CIO treasuries.

Kennedy makes no secret of his hopes to run for President in 1960 on the Democratic ticket. His campaign has already started. He is seeking Reuther's political support. This accounts for Kennedy's public insistence that he knows of no rank-and-file complaints against Reuther, although any Senate investigator on the McClellan committee will tell you the committee has received hundreds of protest letters against Reuther and the UAW. Evidently Kennedy has no time to read his committee mail.

An Indication — "McClellan blunders," the AFL-CIO hierarchy trumpets in the official AFL-CIO News. "He has abused his position as chairman of the special Senate investigating committee by backing a 'right-to-work' amendment."

"Congress may 'throw the book' at labor," the UMW admits grimly.

Dave's Ready — David J. McDonald, president, AFL-CIO United Steel Workers, has sent word to the Senate investigating committee headed by Senator McClellan, D., Ark., that he "welcomes" an investigation of his union. "We have nothing to hide," he states.

Better Defense Jobs for Civilians

Boost for Morale—Civilians are to steer the work in a great many vital defense posts now occupied by military personnel.

The man who orders this change is Defense Secretary Wilson. His new directive on more responsible positions for civilian workers is designed to make better use of employee skills. It has the further aim of improving the morale of many of the 1.1 million civilians employed by the defense forces.

Room to Advance—Opportunities for civilians to advance will be found in numerous support activities where military backgrounds are not essential. Employees with expert knowledge of engineering, purchasing, or manpower management, for example, can replace military men in a wide range of executive jobs.

This will mean there will be instances where activities, departments, or offices will have civilians as managers, while military officers occupy many subordinate roles.

Prevents Mis-assignments — As Mr. Wilson sees it, this fact should prevent the assignment of some officers to executive billets for which they've had scant training.

His directive results from a lengthy study of Defense Dept. personnel policies made by Carter Burgess, until recently the Assistant Defense Secretary (Manpower). Mr. Wilson orders that progress of the new program be reported semi-annually to the top manpower official at the Pentagon.

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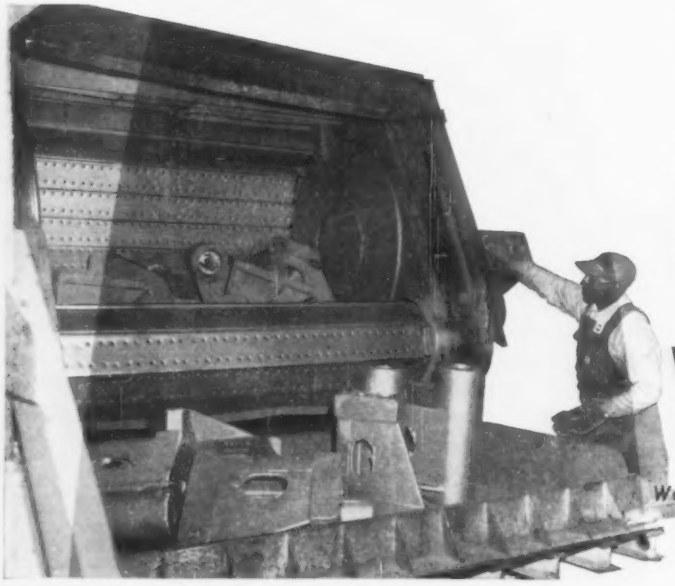
Wheelabrator Steel Shot makes these savings while operating under a wide variety of conditions.

It is used in four different sizes of airless blast cleaning machines. It cleans steel castings ranging from 1½ lbs. to 1,800 lbs. in weight and cleans malleable castings from ½ lb. to 180 lbs. Castings vary in size from 3″ x 3″ x 12″ to 2′ x 3′ x 3′. Sand conditions range from medium to heavy and steel castings are blasted before and after heat treating.

Cleaning an average of 140 tons of steel castings and 75 tons of malleable castings every day, this progressive foundry has reduced annual abrasive costs from approximately $68,000 a year to only $35,000 — a saving of more than $32,000 a year.

Start using this superior heat treated, electric arc furnace steel shot that has proved itself under all types of conditions. Make savings in abrasive costs, speed cleaning and reduce maintenance expense.

For more information, send today for Catalog 89-B.



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How Overtime Loss Hits Aircraft

Both Benefits and Drawbacks Are Due

The industry's metalworking suppliers might find Defense Dept. ruling against overtime a blessing in disguise.

Here's what move will mean to them and to the planemakers as well.—By R. R. Kay.

■ No more overtime in aircraft production, the Defense Dept. has told planemakers. Only missile building, now on a crash basis, is unaffected and will carry on full steam ahead.

What will this new order do to metalworking on the Coast and around the country? Planemakers say they need time to digest it. But here are some pretty obvious angles:

Boon for Subcontractors—1. It might be a blessing in disguise for subcontractors, who've been rumbling they're not getting a fair share of the business. Because the prime contractors' work week is now shorter, they'll have to farm out more.

2. With no overtime allowed, the aircraft companies would have to take on extra help. But where will they get it? Certainly not from the labor-short West Coast areas. Every Sunday edition of the Los Angeles Times runs about 17 help-wanted pages.

3. For the moment, the cut in overtime means less money in many pay envelopes—about $1.5 million less per week. Aircraft industry weekly payroll on the Coast before the cut: $35 million.

Profits Will Benefit—4. Suppliers to the industry all over the U. S. will feel the impact of the overtime cut. They'll have to sweat through many changes in production schedules, inventory, purchasing, and servicing.

5. Planemakers' profits will probably rise. Why? They say overtime work is too costly—less productive.

6. Several major plants would welcome shorter hours for their engineering staffs. They believe the extra leisure will up productivity.

Aircraft Dispersing

It looks as if new large manufacturing facilities for the aircraft industry won't be built on the Coast. That's in line with the Pentagon's present thinking on plant dispersal.

North American Aviation, Inc., Los Angeles, just optioned 12,600 acres 10 miles outside of Reno, Nev. Likely use would be for diversified work, possibly in electromechanical and rocket engine fields.

What's Building?—Other North American projects now underway: (1) U. S. Air Force X-15 rocket-powered research airplane. New design techniques have made big cuts in weight and size.

The plane is expected to explore heights and speeds beyond those of the X-1 and X-2 series, which have gone over 90,000 ft at 1650 mph.

(2) There's been talk that the Pentagon might shelve North American Aviation's SM-64 Navaho Intercontinental Strategic Missile. But the company just got an additional $21 million for more work on it.

ATLAS ISN'T HERE: However, view at Convair does show equipment belonging to that intercontinental ballistic missile. It includes the tubular steel trailer for missile's transport, and tower (in background) which houses equipment for pressure testing of fuel tanks.

Why cars don't mind having the shakes

An occasional health club shake-up makes people feel better. But everyday road vibration can make cars grow old too soon.

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Builders Get Government View

Spring Meeting Held in Washington

U.S. creates special problems for tool builders as a big customer and a tax collector.

Gov't executives say tool programs are shaping up, but slowly.—By E. J. Egan, Jr.

▪ Whether machine tool builders like it or not, Uncle Sam is and will remain a big customer. Like all big customers he creates some special problems.

"Uncle" is also the No. 1 tax collector; more special problems.

At The Source—To tackle some of these difficulties head on, the National Machine Tool Builders' Assn. held its annual Spring Meeting in Washington. For the official U. S. view they invited a string of top government executives to speak.

Russell C. Harrington, Commissioner of Internal Revenue, told builders his Service is well aware of their interest in depreciation and obsolescence for tax purposes.

Check IRON AGE—He believes fast tax write-offs, as part of mobilization planning, are the concern of the Administration and Congress. He referred to Treasury Secretary Humphrey's misgivings about continued, large-scale sanction of fast amortization.

Builders were urged to read Mr. Humphrey's recent article, "Why We Must Limit Fast Tax Write-Offs," The Iron Age, April 18, p. 67.

Mr. Harrington agreed a review of the Government's official useful-life tables for depreciable property is necessary. The most recent revision of these tables was made in 1942.

Tool Programs Drag — Other speakers indicated many Government machine tool programs are shaping up, but very slowly. Wallace E. Carroll, director of BDSA's Metalworking Equipment Div., said mobilization planners are shying away from the idea of building up a large reserve of production capacity. They're leaning toward the concept that stockpiles of military end items are our best form of preparedness for any emergency.

Compromise — This pendulum hasn't swung all the way, however. Many top officials still want a combination policy: (1) Plenty of end items for a nuclear-and-missile war, and (2) ample production capacity to wage a long struggle.

The oft-mentioned Elephant Tool Program is also bogged down so far that it has to be completely re-sold to mobilization planners.

Plans to systematically replace obsolete tools owned by the military services are away behind schedule. Somehow, all the necessary funds to get this program rolling weren't in the budget.

NO GUESSWORK HERE: Portable Monitorecord records duration of up to 14 simultaneously or sequential cycles in fast-working automatic machines. Bar graphs, traced by stylists on moving paper chart, indicate cycle times with 0.01-second accuracy. Time-Sequence recorder is made by the Sheffield Corp.'s Autometrology Div., Dayton, O.

INDUSTRIAL BRIEFS

On the St. Lawrence Seaway—The Bechtel Corp. of San Francisco and New York has been awarded the engineering and construction contract for the new $88 million Reynolds Metals Co. aluminum reduction plant at Massena, N. Y. Bechtel is currently constructing a third unit at Reynolds alumina plant at Corpus Christi, Tex., costing approximately $30 million.

Armour Adds — Armour Research Foundation of Illinois Institute of Technology, Chicago, will build a $1.1 million building addition. Construction of the addition will be the second step in a $4 million expansion program initiated by the Foundation in 1956. The facility is scheduled for completion late this fall.

Electronic Inventory — Crucible Steel Co. of America has placed in operation an advanced model IBM-650 Computer. This "electronic brain" is being used to achieve centralized inventory control over some 16,000 specialty steel items. These items are produced by Crucible and stocked according to geographical demand in the company's coast-to-coast warehouse sales system.

On Target — The Navy has awarded a $1.5 million contract for Polaris fire-control system to General Electric. Polaris is a ballistic missile having a range of about 1500 nautical miles. It will be designed for launching from either surface ships or submarines. Major contractor for the missile system is the Lockheed Aircraft Co., Van Nuys, Calif.

One In a Million—McLouth Steel Corp. has reached its one millionth ton of oxygen process steel at its Trenton, Mich. plant. In the process, high pressure, high purity oxygen is blown on molten iron converting it to steel. According to McLouth, its installation is the first of its kind in the U. S.

All Ahead, Full—The S. S. President Adams, a Mariner Class, round-the-world vessel of American President Lines, has a new propeller designed to save fuel and last longer than a conventional type. The wheel, built by the Eddystone Div. of Baldwin-Lima-Hamilton Corp., is made of nialite. Because nialite is zinc-free, it is less subject to corrosion, cavitation and pitting than manganese bronze.

Invading the South — Revere Copper and Brass Inc. has appointed Vance Iron & Steel Co., Chattanooga, Tenn., as its aluminum products distributor in that area and in Charlotte, N. C., where Vance opened a warehouse last year. Vance, subsidiary of Republic Steel, has become one of the chief sources in the Southeast for stainless steel products and speciality steel items.

Expansive Mood — Schroeder Manufacturing Co., Long Beach, Calif., has announced expansion plans that will increase its production volume to $5 million annually. Manufacturers of valves and other accessories for the aircraft industry, Schroeder was purchased by Frederick W. Richmond of New York last month.

Southern Hospitality — General Motors Corp. will build a $1 million-plus distribution center in Birmingham, Ala., in the new Irondale Industrial Park. Immediately after the GM announcement, Birmingham Mfg. Co. announced it will build a new facility in the same area to manufacture truck trailers. Cost of this plant will be about $225,000. It will have 20,000 sq ft of manufacturing space.

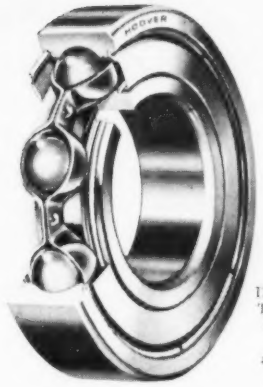
Double Strength — Construction of a second synthetic glycerine plant is under way at Dow Chemical Co.'s Texas Div. in Freeport. Completion of the plant is scheduled for next March.

Caribbean Venture — Electrical drive systems for Cuba's first integrated steel mill have been ordered from Westinghouse Electric International Co. by the newly formed Compania Antillana de Acero. The $800,000 order calls for main drives for a blooming and billet mill and two rolling mills. The $12 million plant is being built at El Cotorro near Havana. It will be devoted to corrugated bars for use in reinforced concrete construction.

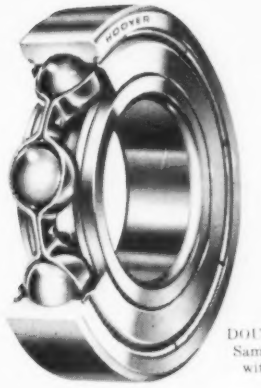
Citation—Glenn W. Geil, metallurgist at the Bureau of Standards, has been awarded the Dept. of Commerce Silver Medal for Meritorious Service. The award recognizes his "exceptional achievement in physical metallurgy, particularly in studies relating to the deformation of metals at subzero temperatures."

Die Is Cast—A new die set assembly warehouse will be opened by the Producto Corp. of Cleveland. Complete line of Producto catalog die sets, diemakers' accessories, and toolroom equipment will be included in the new assembly operation.

"That's all very nice . . . but what about the scrap survey I sent you to Hawaii for?"



DOUBLE SEAL—Teflon contact seal shown. Available with snap ring and with single or double seal.



DOUBLE SHIELD—Same sizes available with single shield.

SINGLE ROW RADIAL—Also available with snap ring.

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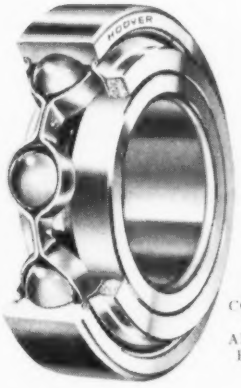
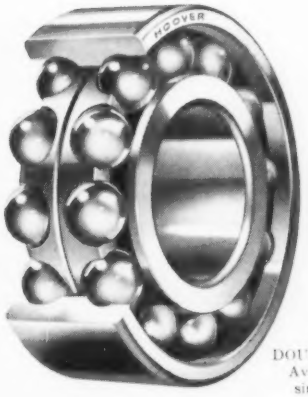
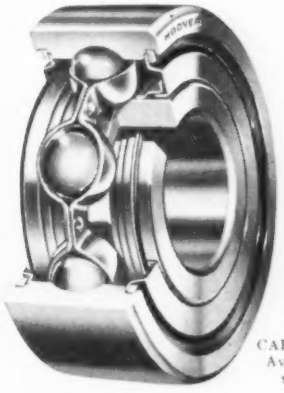


COMBINATION FELT SEAL AND SHIELD—Either standard or wide outer ring.



DOUBLE ROW—Available with single shield.



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HOW THE IDEA STARTED — Back in 1922, a young, up-and-coming company known as "Craine-Schrage" ran a steel warehouse business in Detroit They were also sales representatives for an out-of-state cold strip mill.

By then existing standards, the mill's product quality and service were good. But Craine-Schrage had their own ideas about customer satisfaction and how best to achieve it. To them the only way was to build a strip mill of their own and run it their own way—really, the customers' way.

WHAT HAPPENED — It was a lot easier then than now! On March 9, 1923, Detroit Steel was incorporated. In December 1923 the first lot of strip rolled off the new mill.

WHAT FOLLOWED — Customer satisfaction paid off. By 1937 capacity had grown from 1,000 tons a month to 150,000 tons a year. Ten years later, DSC's Eastern strip business warranted an Eastern plant. That is how the mill at Hamden, Connecticut, came about. It started producing in 1949. Its capacity has grown too. It is now 75,000 tons annually.

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Since then the plant has been rebuilt practically end to end with the addition of a second blast furnace (a 1,400 tonner), five 250 to 275 ton open hearths, a new bloomer, new hot rolled and cold rolled sheet mills and all that goes with them —nearly $90,000,000 worth, with more to come.

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George R. McKenna, elected director and executive vice president, Builders Structural Steel Corp., Cleveland.

W. Roy Widdoes, elected asst. to president, Lukens Steel Co., Coatesville, Pa.; **W. Harrison Lackey,** named general manager, sales.

Hiram B. Young, elected vice president and **F. Leonard Bryant,** elected vice president, production, Hooker Electrochemical Co., Niagara Falls, N. Y.

John N. Miller, elected vice president, general operations, Jessop Steel Co., Washington, Pa.

Thomas S. Nichols, elected chairman of the board, Olin Mathieson Chemical Corp.

Robert W. Murphy, elected chairman, executive committee and **George P. F. Smith,** elected vice president, Borg-Warner Corp., Chicago.

James H. Jewell, elected vice president, marketing, Westinghouse Electric Corp., Pittsburgh.

Don P. Selby, named asst. manager, sales, Cincinnati district sales office, U. S. Steel Corp.

F. Lee Foster, Jr., elected vice president and sales manager, Baird-Atomic, Inc., Cambridge, Mass.

Harry K. Taylor, elected vice president, operations, Jessop Steel Co., Washington, Pa.

Albert R. Pfeltz, named asst. manager, sales, Pittsburgh, Sales Dept., U. S. Steel Corp.; **John C. Pugh,** named asst. manager, sales; **H. W. Rowles,** appointed asst. manager, specialty products sales.

Dr. E. M. Kipp, named director, research, Foote Mineral Co., Philadelphia.

Harry A. Zahn, appointed manager, alloy steel sales, Philadelphia steel service plant, Joseph T. Ryerson & Son, Inc.

Ronald E. Stenning, appointed director, education, Brown & Sharpe Mfg. Co., Providence, R. I.

Don S. Holstein, named manager, Middletown Works, Armco Steel Corp., Middletown, O.

Hugh R. Lowry, named manager, application engineering, Semiconductor Products Dept., General Electric Co., Syracuse, N. Y.

Arnath W. Knabe, named asst. manager, industrial development, Baltimore and Ohio Railroad, Baltimore; **Thomas G. Gordon,** named industrial agent.

Lyle S. Cline, elected vice president and secretary Bucyrus-Erie Co., S. Milwaukee; **David W. Harris,** elected vice president; **William W. Coleman,** named honorary

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William L. Litle, elected chairman of the board and president, Bucyrus-Erie Co., S. Milwaukee, Wis.

Joseph S. Quill, appointed manager, marketing research and product planning, Industry Control Dept., General Electric Co., Roanoke, Va.

Thomas W. Metz, appointed manager, Mid-Atlantic region, Allis-Chalmers Industries Group.

Julius C. Hydrick, named asst. general manager, Riverside Alloy Metal Div., H. K. Porter Co.

Charles E. Phayre, appointed asst. sales manager, Penn Precision Products, Inc., Reading, Pa.

George F. Crosby, Jr., appointed manufacturing manager, Robins Conveyors Div., Hewitt-Robins, Inc., Passaic, N. J.; **Edward J. Mytkowicz,** appointed manager, operations, Jones Machinery Div., Chicago.

Otto A. Pfaff, elected chairman of the board, Wheelabrator Corp., Mishawaka, Ind.

Herbert J. Niemann, named sales engineer, Pangborn Corp., Hagerstown, Md.

Robert A. Engelhardt, appointed purchasing agent, Michigan Limestone Div., U. S. Steel Corp.

I. W. Evans, named chief engineer, cranes, The Morgan Engineering Co., Alliance, O.

George V. Lang, elected vice president, United Engineering and Foundry Co.

J. Y. McCandless, named manager, Syracuse, N. Y., district sales office, Tubular Products Div., The Babcock & Wilcox Co.

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With ZB-57, the basic solution formulation can be varied to meet special plating needs such as deep throw of the plate, or highest demands for speed.

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The blue-white finish of ZB-57 sparkles with sales appeal! It is unusually bright, and exceeds by far the standard for a decorative bright zinc.

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Since deposits have exceptional brightness, bright dipping is often eliminated. ZB-57 Bright Zinc ensures high quality finishes with minimum processing.

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The protection against corrosion afforded by a zinc coating is proportional to its thickness. This process is no exception. Users will receive more protection per dollar than ever before.

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Edward V. Huda, named director, research and development, Adhesives Dept., Raybestos-Manhattan, Inc., Bridgeport, Conn.

Harvey J. Haughton, elected vice president and controller, Jones & Laughlin Steel Corp.

William Ohly, named manager, distributor sales, Acro Div., Robertshaw-Fulton Controls Co.

Joseph A. E. Hindman, named sales manager, U. S. Gauge Div., American Machine & Metals, Inc., Sellersville, Pa.

Joseph H. Reid, appointed general manager, Titanium Div., National Lead Co.; **Graham W. Corddry,** named manager.

David M. Davis, named asst. district manager, Superior Steel Corp.'s Dayton, O. sales office.

Edward F. Busby, appointed sales representative, Metal Finishing Div., Frederic B. Stevens, Inc.

H. Charles Yaeger, named plant manager, Vickers Incorporated, Jackson, Miss.

Ferd Chiappetta, appointed wire rope engineer, Macwhyte Co., Kenosha, Wis.; **Fred E. Dykeman,**

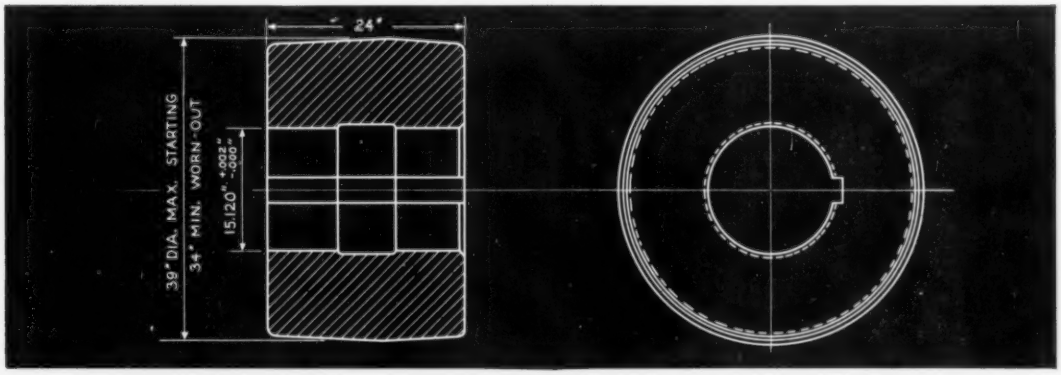
TIPS FROM A ROLL MAKER'S NOTEBOOK

MACKINTOSH-HEMPHILL DIVISION, E. W. BLISS COMPANY, Pittsburgh 3, Pennsylvania

Cast mill rolls • Johnston cinder pots • rotary tube straighteners • end-thrust bearings • heavy-duty lathes • steel and special alloy castings

THE SECRET OF GOOD TUBE MILL RINGS:

Put the extra metal where it does the least harm



Any roll ring cast with a cored hole creates special problems. Tube mill piercing rolls are no exception.

General foundry practice has been to allow sufficient stock on both the outside diameter and bore to permit "giving a little and taking a little" to "true" the finished O.D. with the I.D. when machining. Mack-Hemp foundrymen have modified this practice by keeping the outside stock at a minimum and increasing the stock in the bore. This extra stock in the bore provides an ample margin for "truing up" the two diameters during finishing, with only a bare minimum of metal removed from the O.D.

The roll user benefits in two ways—better rings at a lower price. In the first place, with roll rings priced as they are, on a "cent-per-pound-on-rough-weight" basis, he saves money. This is because extra metal near the center of the roll weighs far less than the same thickness at the roll surface. For instance, every ¼" of oversize on the O.D. of a 39" diameter, 24" long ring adds roughly 110 pounds of metal. On the other hand, ¼" extra stock on the 15" bore of the same ring adds only 40 pounds.

The segregation problem—Even more important, however, is the improvement in the depth of sound metal below the surface of the cast roll which is gained by casting to minimum tolerances on the O.D. and maximum on the I.D. Mack-Hemp tube mill rolls are noted for their freedom from the "segregated streaks" which lead to scrapping before worn-out diameter. Since these flaws usually occur at a fairly regular depth below the outside surface of a cast roll, the closer the O.D. as-cast diameter is to the finished diameter, the deeper this zone of segregation.

The relation of "bite" to hardness and wear—A very important requisite of a piercing mill roll is good "bite" to eliminate slippage. Ideally, this should be achieved without sacrificing too much wear resistance. Fortunately, bite and wear resistance are not always in direct proportion to hardness. Both these qualities can be combined—at least to a degree—in the same roll. For example, a roll of one alloy type may slip more than a harder roll of another type. Today, higher speed mills have stepped up the demand for these better, harder rolls.

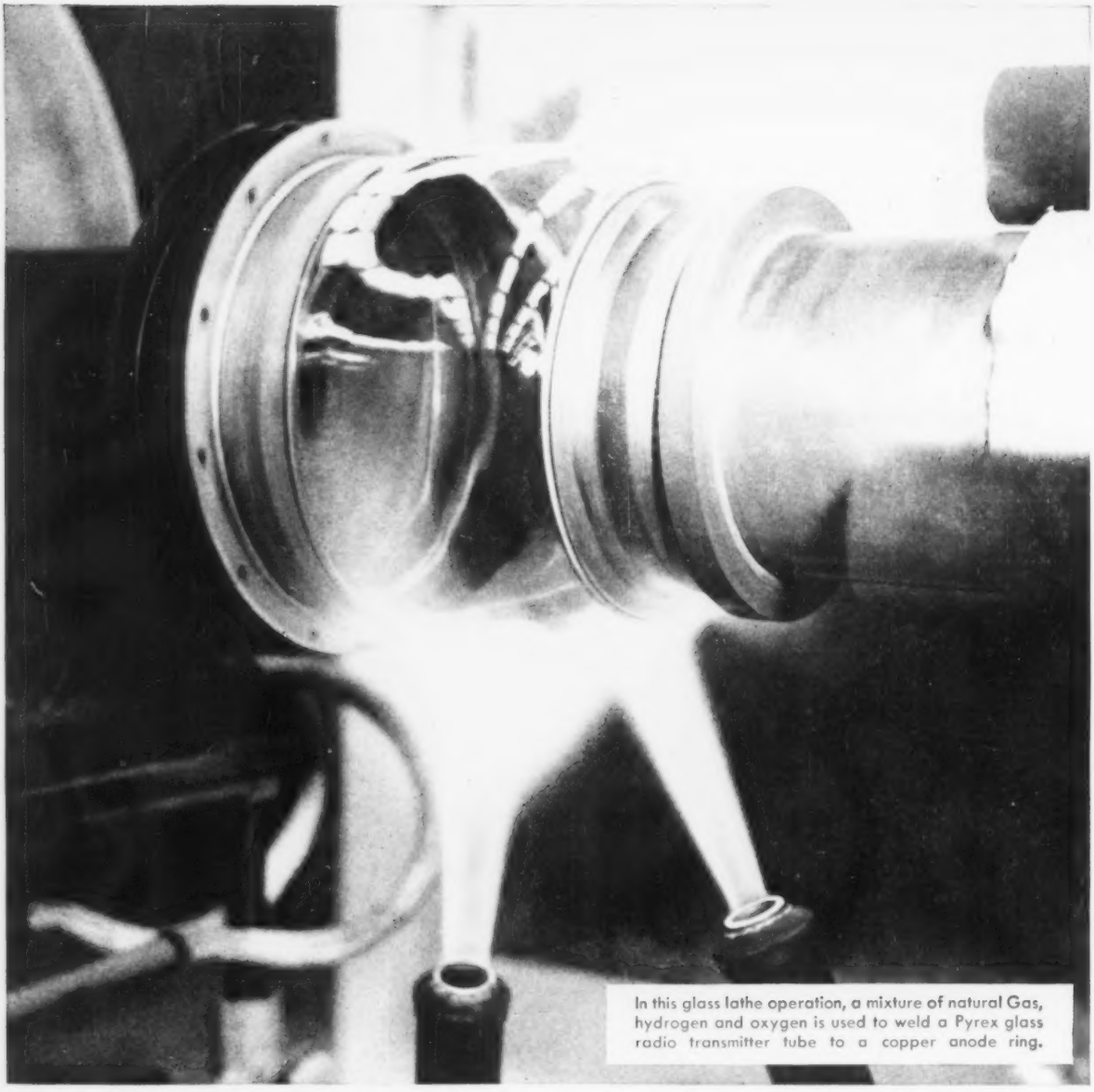
Mack-Hemp's broad experience with the many tube mills now in operation can be of real help to any tube mill operator with a roll problem. And it's the same story no matter what your type of mill. For help with any problem of roll use, call on Mackintosh-Hemphill Division, E. W. Bliss Company, 901 Bingham Street, Pittsburgh 3, Pennsylvania.

MACKINTOSH-HEMPHILL

You get more tonnage from the rolls with the Striped Red Wabblers

Division of E. W. BLISS COMPANY

Presses, Rolling Mills, Special Machinery



In this glass lathe operation, a mixture of natural Gas, hydrogen and oxygen is used to weld a Pyrex glass radio transmitter tube to a copper anode ring.

RCA welds glass to metal at over 2000° F. ...thanks to GAS

Natural Gas is used to weld glass to metal in the production of radio and television tubes of many types at the RCA Tube Division plant in Lancaster, Pennsylvania.

To effect the weld at over 2000° F., a mixture of natural Gas, hydrogen and oxygen maintains the high welding temperature on the Pyrex glass and metal parts as they rotate on a glass lathe. A Gas flame is then used to control and equalize the cooling of the glass down to the 900-600° F. range.

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•

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Give your product this tough armor cladding

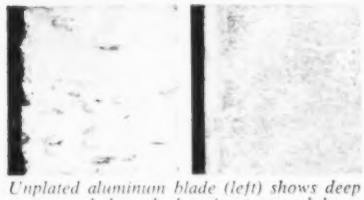
If the products you make must take a beating from erosion or abrasion, Lectro-Cladding with *super-hard nickel* may very well be your answer—as it was in the case of Hamilton Standard propeller blades.

Bombardment of trap rock leaves propeller blade unscathed

In a recent dramatic test, a twin-engined airliner was equipped with one blade of unplated aluminum and another that had been nickel-plated by the Bart Lectro-Clad process. The plane was taxied onto a runway covered with loose trap rock. The volley of rock sucked into both blades left the unplated prop chewed and gouged. The nickel-clad blade emerged practically unscratched. Lectro-Clad is now "standard" on many leading planes, commercial and military.

Bart Lectro-Clad process is adaptable to the functional plating of many products and parts in which resistance to erosion, corrosion, and contamination are vital performance factors. Nickel at hardness never known before is just one of the materials that can be Lectro-Clad to a wide range of base metals. Other metals include chrome, copper, gold, and rhodium.

For assistance on any problem that plating might solve, Bart offers one of the most extensive research and development departments in the electro-plating industry. Always available for consultation service.



Unplated aluminum blade (left) shows deep gouges and chewed edge after trap rock bombardment. Lectro-Clad blade (right) shows little effect from identical exposure.

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appointed fabricated products engineer; **Vernon J. Young,** appointed junior product engineer.

V. M. Holloway, named director, Sales Dept., Construction Machinery Div., Allis-Chalmers Mfg. Co.; **J. M. Haile,** named asst. sales manager; **K. A. New,** named Eastern territory manager.

Frederick W. Leslie, named sales engineer, Wire Machinery Dept., Morgan Construction Co., Worcester, Mass.

John W. Lindsey, elected vice president, purchases, Jones & Laughlin Steel Corp.

George D. Lawrence, appointed chief engineer, electric furnaces, American Bridge Div., U. S. Steel Corp.

Oliver F. Redd, named technical service consultant, Process Equipment Dept., Dravo Corp., Pittsburgh.

Vernon G. Kneeskern, named project manager and plant manager, aluminum reduction plant, Reynolds Metals Co., Massena, N. Y.

Paul L. Lantz, appointed production manager, Abrasive Div., Norton Co., Worcester, Mass.

Robert W. Hoefler, named asst. sales manager, Verson Allsteel Press Co., Chicago.

Lewis R. Darlin, named manager, Dexion Div., Acme Steel Co., Chicago.

A COMPLETE REFRACTORIES SERVICE . . .

for the Steel Industry

OLIVE HILL BF and OLIVE HILL HI-FIRED brick rank high in any list of prominent and widely used brands of blast furnace refractories. Manufactured from dense-burning Kentucky flint fire clays by Grefco's unique manufacturing processes, OLIVE HILL brick set a standard for blast furnace refractory quality and workmanship.

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2. Grinding and screening to prescribed formula to promote high density of product.
3. Efficient deairing during brick forming, also to promote density and proper physical structure.
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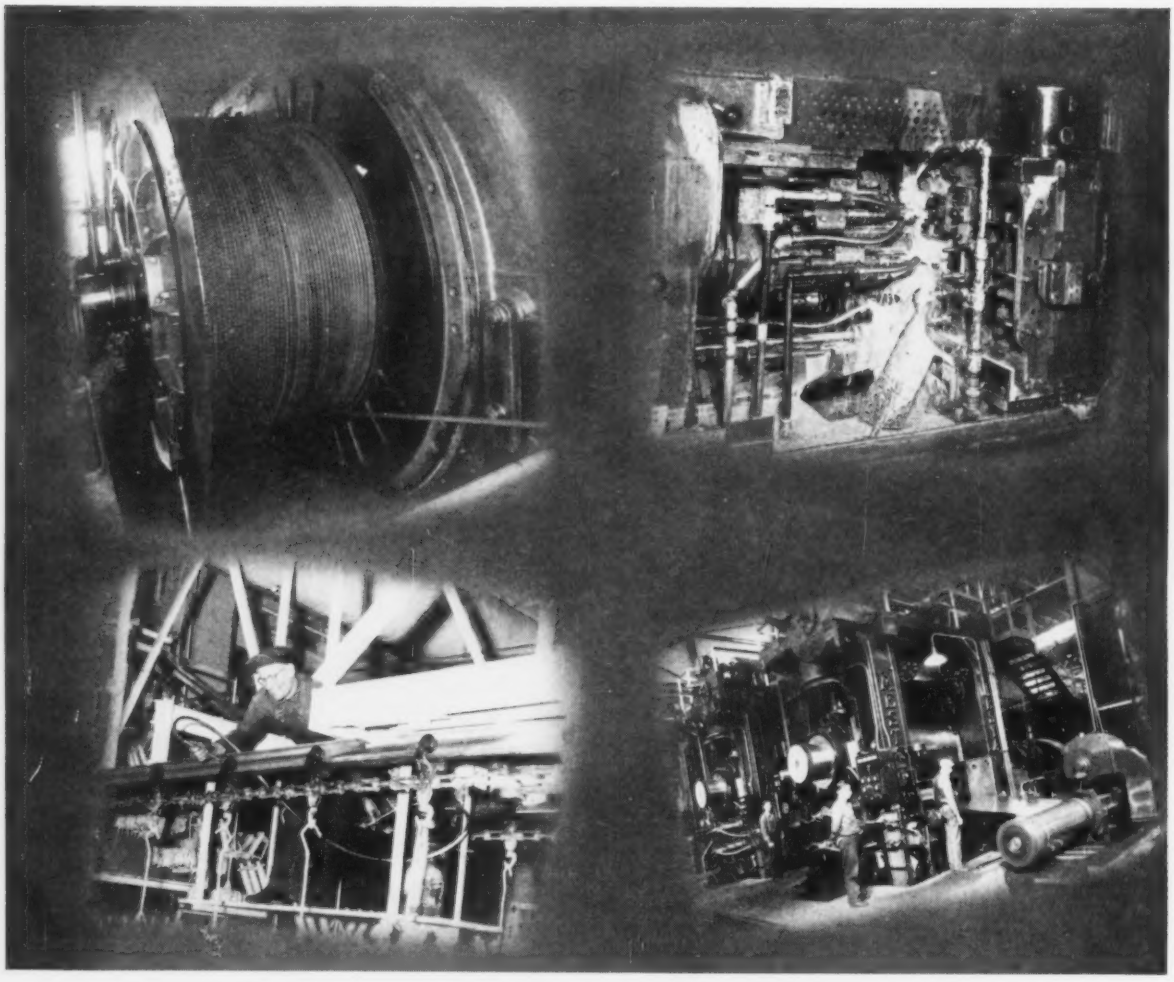

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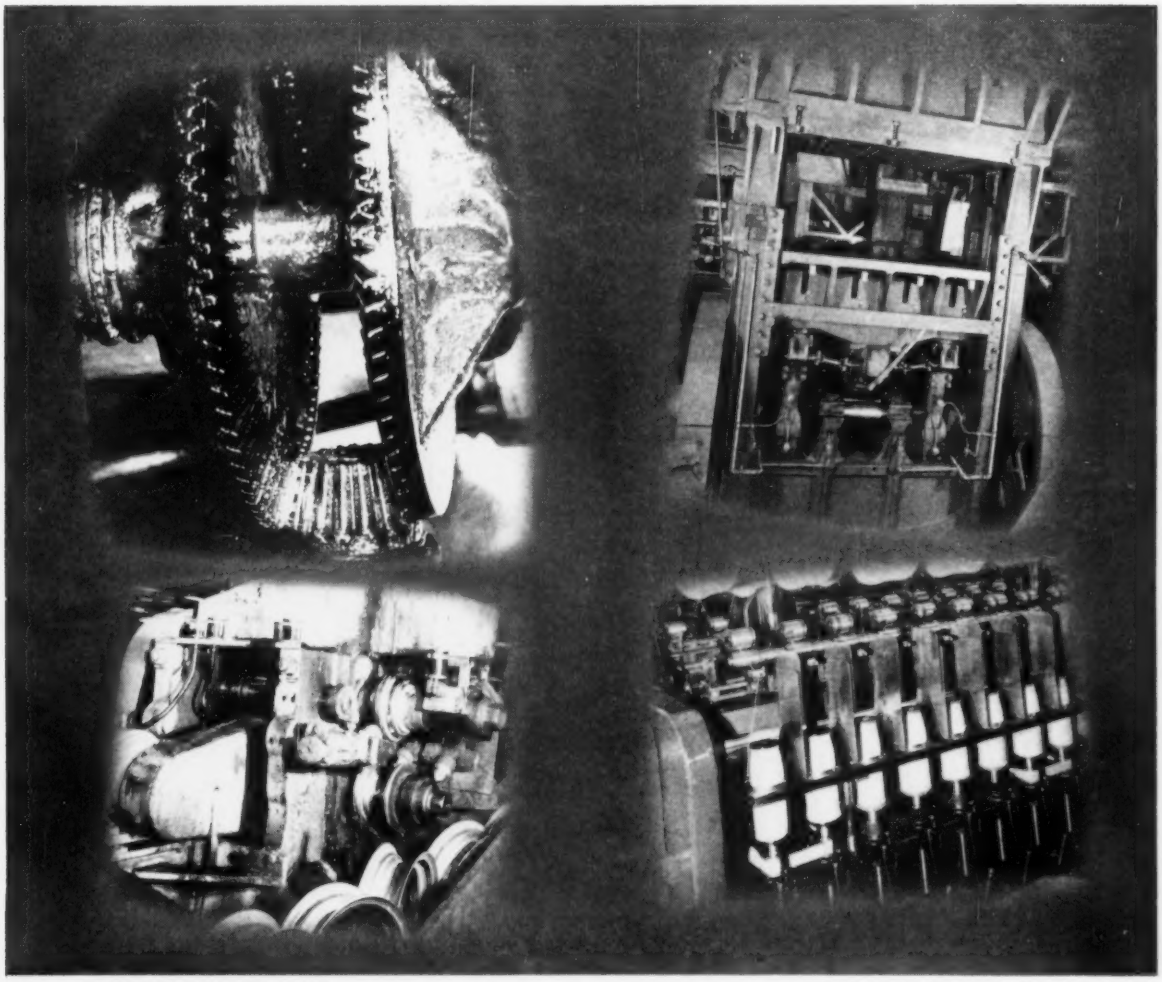
Chances are there's more than one place in your plant where a Houghton "specialized" lubricant can help make your equipment more productive, reduce maintenance and cut costs. Whether in central lubricating systems, open gears, or any other lubrication "problem spot", Houghton can prescribe the right lubricant to do the job.



PROBLEMS: a job for a specialist

IT WON'T MELT *Cosmolube* is a multi-purpose grease that resists heat, water and cold. It has exceptional film strength. Heavy loads will not change its composition. It can be used with any conventional greasing equipment. Requires few applications, little attention even under heaviest service.

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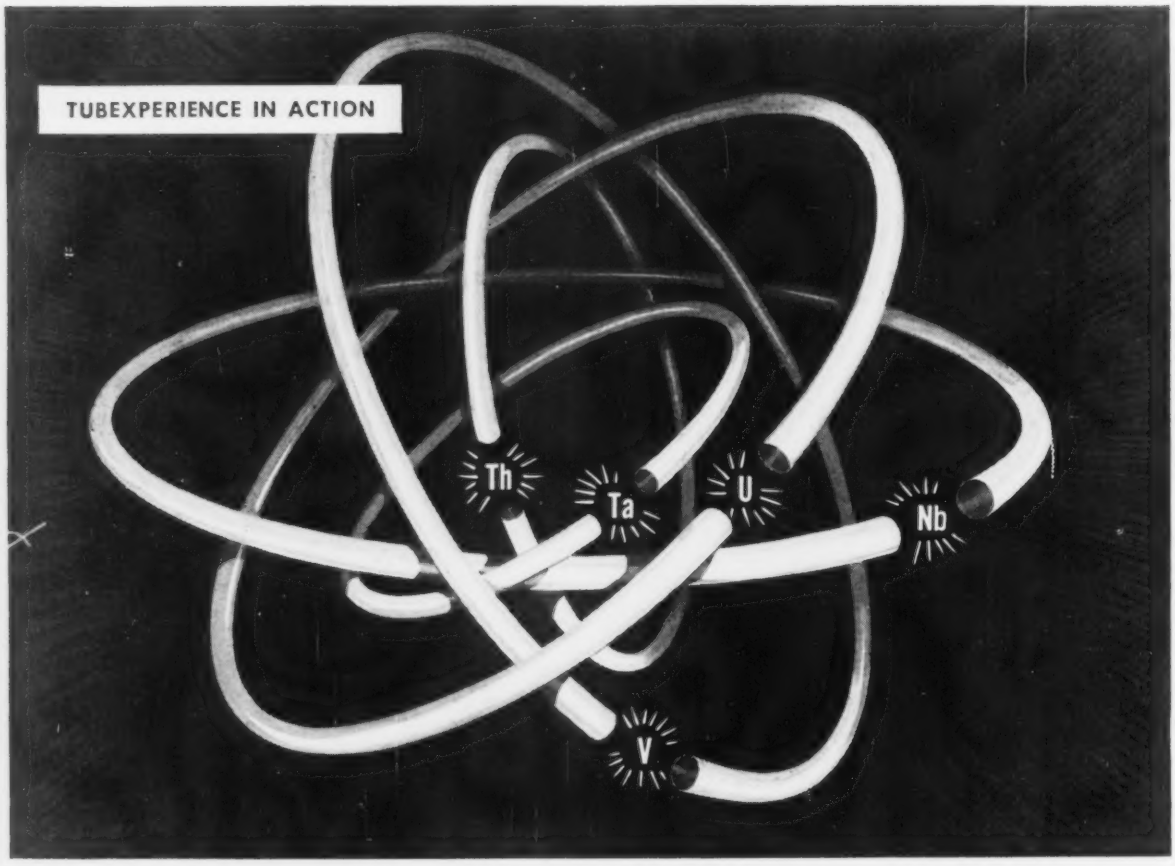

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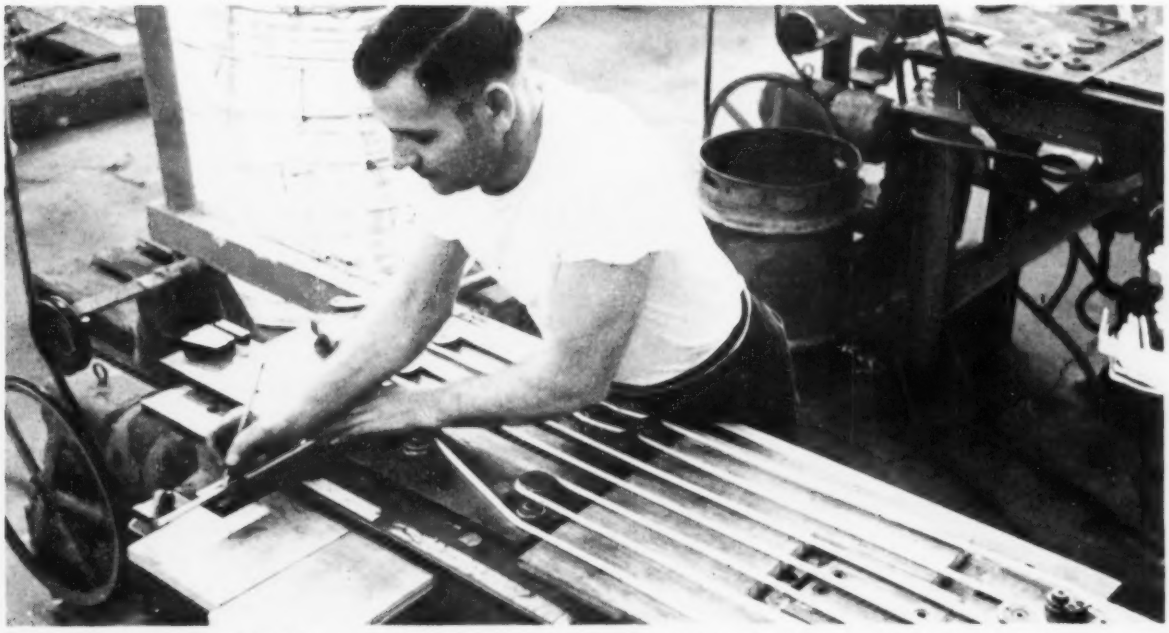


FROM CARS TO COOLERS: Bending aluminum tubing for refrigerators is one way Bohn diversified.

Auto Part Makers Go After Diverse Markets

By W. G. Patton—Engineering Editor

Making a small profit in a high-production business sounds good. But it's a different story when the competition is tough and the work seasonal.

That's what auto parts suppliers were faced with. To offset this, they've found ways to stay healthy financially.

■ Outsiders looking in on the auto parts business think of it as a pretty rough way to make a profit. As an industry, it's had some failures—some withdrawals. Competition now is a good bit tougher than it has been for some years. Some big names have faded away and many small firms have lost key contracts. Yet, it's a healthy industry. How can this be?

Two major reasons are behind it: (1) Replacement volume, usually affected favorably by a slumping new car market, shows steady growth and (2) diversification programs started a few years back are now paying off.

How Diverse?—A quick glance at only a partial list of products now made by auto parts manufacturers gives some idea to what extent the industry has diversified. In it are items such as mechanic's hand soap and hack saws. But some firms have driven a strong wedge into industries such as the appliance, aircraft, electrical, air conditioning and farm equipment.

Let's take a closer look at Bendix, one of the larger auto parts producers. Its sales of automotive parts grossed $110 million in 1955. Its gross sales to all industries in the same year were well over $600.

Here's another case of a firm putting its eggs in different baskets. Three years ago, Bohn Aluminum & Brass Corp's. production was 60 pct automotive. Today, it stands at about 30 pct.

Borg-Warner, doing a business of more than $500 million per year, is about 43 pct automotive. Eaton

The carmakers buy less, but they're far from self-sustaining.

Manufacturing Co. and Thompson Products are in the neighborhood of 40 pct automotive.

Factors For Success—Versatility, decentralization and enterprise top the list of essentials to stay in the auto parts business. Those who don't move, expand, modernize or diversify are bound to drag behind or die off in what has become a fiercely competitive picture.

How large is this industry? Some 400 companies do about 80 pct of the total parts business. Add to this figure about 2000 smaller specialists making relatively simple parts for cars.

Annually, these manufacturers sell about $3 billion worth of original equipment to the car makers. They sell another $2 billion worth as replacement parts. Handling this huge production job takes a working force of some 400,000 persons.

The Detroit area is still the focal point for the auto parts industry. About 70 pct of the parts are made within a 300-mile radius of the city. But a strong trend has developed toward decentralization. More than 30 states now share in auto parts production.

Industry Sound—There's ample evidence that auto part makers are doing quite well financially. Reports from 74 firms showed that their sales for 1954 were nearly $5,252 million. This value jumped to more than $6,175 million in 1955. Earnings after taxes in 1954 were more than $213 million as compared to almost $322 million in 1955. They stayed at about the 1955 level for 1956.

What about the trend by the auto makers to make rather than buy parts? The answer seems to be that the car manufacturers have a long way to go before they can become self-sustaining. Recent figures by the Automobile Parts Manufacturing Ass'n bear this out.

	Parts Made	Parts Bought
General Motors	49 pct	51 pct
Ford	41 pct	59 pct
Chrysler	35 pct	65 pct
Independents	30 pct	70 pct

In spite of this trend by the car makers, a bigger parts business is now shared by about 40 fewer manufacturers than 10 years ago.

Scatter Plants—Actually, auto part manufacturers have been drifting away from Detroit for years. Firms like Houdaille Hershey no longer have any plants in Detroit. Bohn Aluminum and L. A. Young still operate in Detroit, but each has large facilities outside Detroit. Eaton and Thompson Products have large plants in Cleveland and in outstate Michigan.

A chief reason for decentralization is that only about 30 pct of all cars made are now assembled

A WORD ABOUT DIVERSIFICATION—

▪ Here's what S. D. Den Uyl, President of Bohn Aluminum & Brass Corp., and currently President of the Aluminum Ass'n, said about his firm's stand on diversification:

"Some time ago, we set out to diversify and we have been successful in doing it. Only about 30 pct of our business is dependent on the automobile industry. I should explain that while we are interested in the non-automotive line, we are not slackening our efforts in soliciting auto parts business. For example, pistons engineered and designed by Bohn are in more new cars today than at any time in history. Bohn designed aluminum-on-steel bearings are gaining acceptance in the heavy-duty engine and we think this type of bearing soon will be standard in the passenger car."

How to make auto parts . . . and stay alive

Diversification—It's the best protection an auto parts supplier can have for long-range stability. It insures against loss of Detroit orders and is a forward step toward increasing volume.

Set Up Planning Committees—Many firms have organized permanent advisory and technical committees to help carve out a course of future action. Studies are made in areas as (1) markets, (2) new products, (3) competitive position analysis, (4) geographical location analysis, (5) freight rate analysis and (6) labor and labor training.

Use Outside Consultants—They can give you a fresh and different outlook on your potential. They've been used to good advantage, particularly on market studies. They'll also check and evaluate your manufacturing methods and facilities. The service may help to point out steps you can eliminate; things you ought to do; where you're heading in this tight competitive contest.

Manufacturing Research—Keeping fully informed of new developments pays off well. It's the inquisitive staff—manufacturing and executive — that seeks out better ways of doing a specific job.

Personnel Research—Well trained personnel is a valued commodity in industry. Pushing your luck too far in hope that the right person may come along is a costly policy to pursue. Personnel training is only part of the job, but an important one. Other possibilities along this line are almost without limit.

in Michigan. It just doesn't pay to ship all auto parts from Detroit. A dispersed auto industry means a dispersed parts industry.

Here's how Frank Rising, Secretary of the Automobile Parts Manufacturing Assn., explains the changing situation: "More than 8 years ago, some members of our group started well-integrated diversification programs. Committees were set up to see: What products should be continued? What products should be dropped? What new markets could be reached?"

These efforts at long range planning are now paying off. According to Rising, "Some of our members are now down to 30 pct automotive or less. Many are below 40 pct. No auto parts manufacturer has a sole auto producer for a customer. And no auto manufacturer has a sole parts supplier."

Why automobile manufacturers tend to concentrate their operations is not generally understood. Here are the reasons Rising cites for increased integration by the car industry: (1) It helps to iron out employment peaks and valleys. (2) Big car producers can make parts during a model changeover. (3) It pays to keep men at work.

There are other penalties for layoffs that are often overlooked. SUB costs money. Hiring costs money. Layoffs are a poor move politically, particularly in an industry that has been notable for mass layoffs.

A hard-pressed parts maker may wonder why someone can't save him. But most in the industry look at it more realistically. They avoid concentrating their production for one industry; in fact, they keep adding to the variety of industries they supply.

There are interesting but hardly self-evident reasons why the auto firms don't take over many lines of parts. Valves, for example require constant engineering and research. Better engine performance, strategic materials and other factors need constant re-evaluation. This means regular expenditures for development. That's one reason why only two producers remain in this field.

If the auto industry took over its own valve production, it would have to take over a lot of engineering and research as well. Any prospect of this may not be too inviting to an auto executive.

Another factor is often overlooked. Generally, the parts industry takes the initiative to develop new car parts. Is the auto industry going to wipe out this kind of initiative, particularly when the parts industry helps to keep its own research and development team on its toes? Most veteran observers think not.

Many part makers use tools supplied by the auto industry. Is the industry going to kill off its own chance to decentralize?

It all boils down to this: Car producers can't make all the parts they need. And they can't continue to buy parts outside if they can make them cheaper.

As things now shape up, it seems that the auto part suppliers will not only make parts for everything that rolls but also for many products that don't roll. One thing is certain. No company in the industry can afford to stand still. It'll have to move ahead if it wants to survive. It'll have to do this by diversification, decentralization, modernization and research. To do otherwise simply means postponing the inevitable.

Screening Fiction From Fact

Differences between popular notions and actual facts in the auto parts industry are rather striking. These are only a few examples from a long list.

FICTION	FACT
1. Auto parts firms are rapidly being forced out of business.	Auto plants are pulling more production into their own plants. So are auto parts firms—through diversification.
2. Failures of auto part producers have been frequent.	You hear about the failures, not the successes. Mostly due to diversification, many auto parts companies have grown at a faster rate than any of the Big Three car makers.
3. Auto parts makers have been caught flatfooted by the loss of Detroit orders.	Some have been caught off base. But many have been moving steadily away from automotive into appliance, furniture, farm implements and other markets.
4. Auto parts firms are entirely dependent on new car production.	Many parts firms have 40 pct or more of their business in service parts. Some are 100 pct in service. And most firms make something other than auto parts.

Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept., THE IRON AGE, Chestnut & 56th St., Philadelphia 39, Pa.

New Fastener Stays Strong At High Temperatures

While this bolt was developed to cope with heat-strength problems on high-speed aircraft, it opens new design vistas in atomic and chemical process work as well.

And the same metal presumably might be used for the structures themselves.

■ Mach 4 flight took a giant step closer to reality when Standard Pressed Steel Co. unveiled its new Hi Tm 9 fastener. Setting out to answer an aircraft-industry plea for hardware that could take 800° skin temperatures, the Jenkintown, Pa., firm came up instead with a bolt that maintains 170,000 psi min. tensile at 900° F.

While the initial line consists of 12-point external wrenching head bolts for aircraft and missiles in the 2000- to 3000-mph class, SPS says it can make shear or tension fasteners of any type with similar properties. This opens up new design possibilities in many fields, including power plant turbines, nuclear vessels, and chemical process equipment calling for high temperatures and pressures.

The material used is Vascojet 1000 made by Vanadium-Alloys Steel Co., Latrobe, Pa. It's a modification of the same firm's Hotform steel, an old standard for high-temperature tool and die work. Significance of this development may be broader than bolts—Vascojet and similar 5 pct Cr hot work die steels might find use in structures as well.

Diffused nickel-cadmium plating is applied for corrosion resistance. Conventional cadmium would melt just above 600° F, diffuse into the bolt metal and cause embrittlement. The new plating is applied as separate layers of nickel and cadmium; the two are then diffused into an alloy by thermal treatment. It will withstand temperatures up to 1000° F.

Table I shows the new bolts to be stronger at 900° F than conventional high-strength fasteners are at room temperature. Other physicals prove equally good, as shown in Table II.

An important factor in the fatigue and stress rupture performance of the new bolts is their thread design. The larger root radius employed reduces severity of notches and adds slightly to minimum cross-section area.

Initially the new bolts and companion self-locking nuts will be made in diameters ranging from $\frac{1}{4}$ to $1\frac{1}{2}$ in. The locknut, a one-piece all-metal Flexloc type, will be made of AMS 6304 steel, since nut requirements are not as rigid as for bolts.

TABLE I
New Bolt Compared With Standard High-Temperature Types

	Tensile Strength, psi		
	Room Temp.	800 F	900 F
Hi Tm 9 Vascojet 1000	220,000	190,000	170,000
AMS 5616 stainless steel	145,000	105,000	95-100,000
AMS 6304 alloy steel	145,000	123,000	100-120,000

Note: Data are for bolts, not specimens of metal.

TABLE II
Minimum Physical Properties of Hi Tm 9 Bolt

	Room Temperature	Tested @ Room Temp. after 100-hr Soak @ 900 F	Tested @ 900 F
Ultimate Tensile, psi	220,000	220,000	170,000
Yield Strength 0.2 pct offset	185,000	185,000	140,000
Pct Elongation in 4 Diameters	10	10	16
Pct Reduction of Area	35	35	50
Shear Strength, psi	140,000	140,000	100,000
Stress Rupture, Psi for 100 hr life			130,000
Fatigue Strength, Psi @ 8,000,000 Cycles, 10 pct preload	80,000	55,000	80,000
Impact Strength, ft-lb	18	18	23

TO BE SURE: Drafting room in modern "fireproof" building is equipped with sprinklers to guard against loss of valuable drawings.

COMMON HOT SPOT: Vapors and deposits in paint-spray booth easily ignite. This one has two CO_2 units in ceiling, detector between.

Fire Protection Pays Its Own Way

By **C. J. Hura**—Chief Engineer, "Automatic" Sprinkler Corp. of America, Youngstown.

Fire protection can save you money even if you never have a fire. If you do, it can save your business.

Systems pay for themselves out of insurance savings, often in less than four years.

And through finance plans, it can be done without making any capital investment.

■ If you have a fire, a sprinkler system can save your business. This seems obvious, but few people realize how crippling a fire can be, even to a business with broad insurance coverage.

Lesser-known is the fact that a sprinkler system is actually a highly profitable investment. It not only pays for itself in a short time but continues to earn upward of 15 pct annually on the original investment in the form of insurance savings.

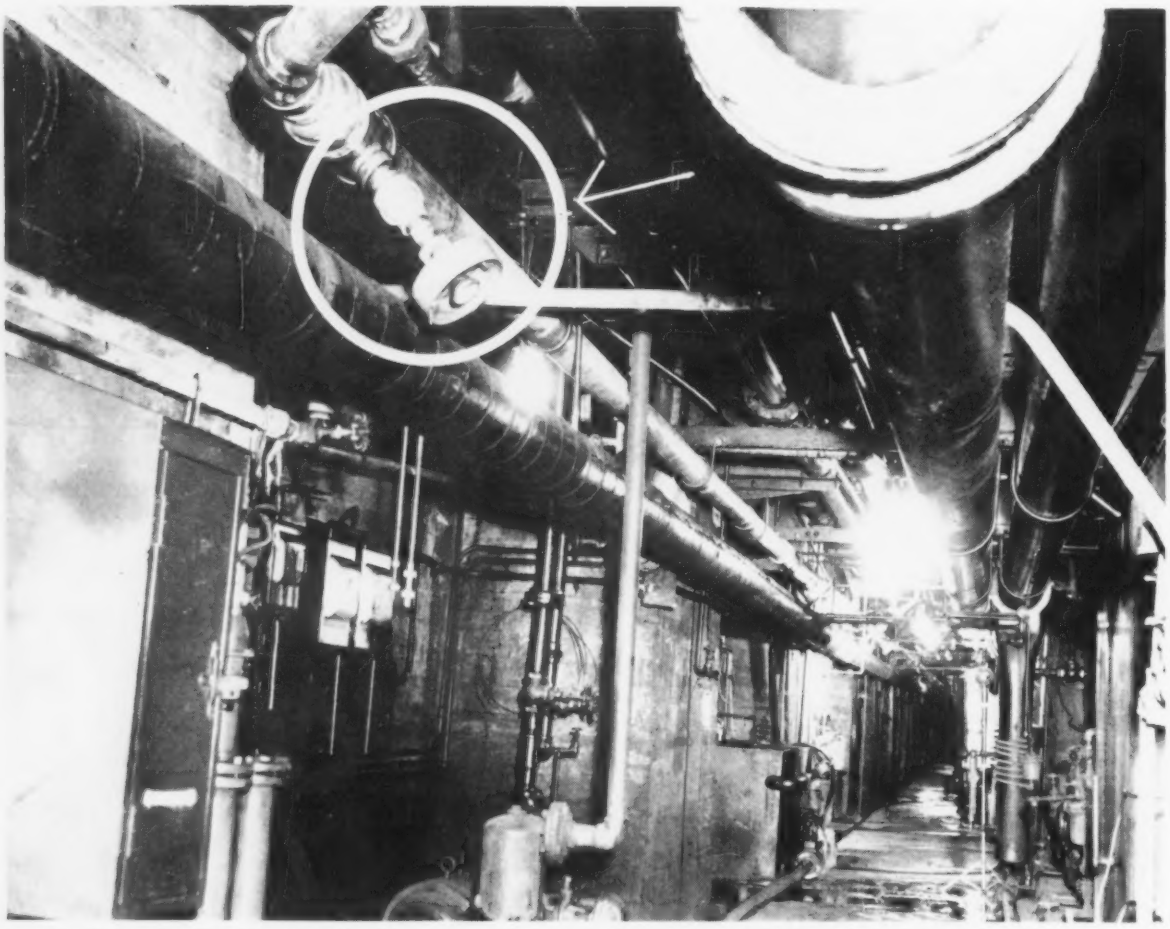
Few buildings are really fireproof. They may be made of materials that won't support combustion, but not so their contents. Most plants contain at least some combustibles — paints, lubricants, packing materials, electrical insulation, coolants and hydraulic fluids.

Ruin Still Results—Once a fire starts, these combustibles can spread it through the whole plant. This can be serious even if the building doesn't burn out completely. When a fire gets going steel beams warp and sag, masonry spalls and concrete is often ruined by expansion of reinforcing steel; a building may be rendered just as useless as if it had burned to the ground. And while a machine tool won't burn, it can be ruined by heat from even a localized fire.

Moreover, all plants have "hot spots" where a fire can curtail or stop the entire plant's output. While steel producers make non-flammable products in buildings that are usually fire resistant, they recognize the need for fire protection in key locations—places like power plants, electrical control and drive equipment, and pits under production machinery where oil is likely to collect.

It's a common fallacy to think of fire damage in terms of physical objects which can be replaced if enough money is available. Most business people carry fire insurance on buildings, equipment, and contents. Business interruption insurance is common. However, few plants have enough insurance, and no amount of coverage can assure restoration of business to previous levels after a serious fire.

Insurance can't restore lost life or repair permanent injuries. Aside from humanitarian aspects of in-



LEAKING LUBRICANT HAZARD: Heavy equipment in Youngstown Sheet & Tube plant is protected by CO_2 system in piping runway at base. It guards against possible fire if lubricants should leak.

juries and deaths they often mean lawsuits, unfavorable publicity and lowered employee morale.

Too Little Too Late—Few plants actually have enough insurance to replace buildings and their contents at current prices. Even if coverage is adequate, it isn't the whole answer. Loss of blueprints, patterns, and accounts-receivable records can cripple a business no matter how much cash is available.

There's also the question of time. Heavy machine tools and structural steel aren't usually on shelves waiting to be delivered. Special machinery, dies, jigs and fixtures take time to replace.

Business interruption insurance, known as U & O (use and occupancy) insurance, may cover loss of profits during these delays. But few manufacturers are lucky enough to have customers who can wait. Most customers will be forced to find other sources of supply, and it'll be an uphill fight to win them all back. Add to this the probability of idle skilled help going into other jobs, and the business might never get back on its feet.

Pays For Itself—Fire protection will prevent most of this. A good clue to its effectiveness is the fact that a sprinkler system sharply reduces insurance rates. Almost any plant can expect an approved sprinkler system to cut insurance premiums anywhere from 50 to 90 pct.

Since the usual sprinkler system isn't expensive to install even in an existing building it soon pays for itself. After it's been paid off, it continues to earn a handsome return on investment. In one respect the benefits actually grow over the years. As a plant gets older or more crowded the fire hazards increase, but efficiency of the sprinkler system stays the same.

The accompanying box shows how typical installations have created annual insurance savings ranging up to 30 pct of the installed cost. This is true regardless of the type of business or degree of fire hazard. While insurance rates depend on the nature of products and processes and type of building construction, the ratio between sprin-

klered and unsprinklered rates is virtually unaffected by such variables.

Other Benefits—Still further savings may result. For example, Heyer Corp., Chicago manufacturer of duplicating machines and supplies, had a staff of night watchmen in its unsprinklered plant. After sprinklers were installed, the company was able to use electric central office supervision. Net savings after the cost of the supervision service amount to about $5000 annually. The sprinkler system cost less than $21,000.

A varnish manufacturer saved an estimated $100,000 in construction costs by installing protection for storage tanks of highly flammable liquid. The other alternative was to move the tanks away from an adjacent loading platform on one side and a main-trunk railroad on the other.

This is typical of a common situation: as a plant grows and is rearranged, hazardous storage or processes once isolated may be crowded by the change. In many cases removal to a new isolated location is impractical, impossible and in any event costly. A special-hazard sprinkler system may provide the answer.

Pay As You Save—Deferred-payment plans make it possible to spread payments for a fire protection system over a number of years. Usually the annual payments are equal to or even less than insurance premium savings, so the system can be put in without additional cash investment.

Insurance savings aren't entirely clear profit, of course; there are some fixed annual costs for inspection, and insurance and taxes on the system itself. But these come to a very small percentage of savings.

Heyer Corp. found its $21,000 system required no additional outlay. Its lower insurance premium, plus the first year's payment on the sprinkler system, was $600 less than the firm's former insurance premium. In six years, Heyer will have paid for its sprinklers out of insurance savings and paid for installation of its night supervision system. From then on it will realize over $7000 annually on insurance savings alone, a return on investment of more than 30 pct.

In Case of Fire—Savings shouldn't obscure the fact that a system's real purpose is to protect against fires.

Fire protection systems are available for almost any type of hazard. The simplest and most common sprinkler system is designed to operate after a fire begins and to put it out before it spreads. In many cases a system can be designed for activation by conditions which could cause a fire or explosion, thus removing the danger before it gets critical.

Sprinklers can handle most hazards, but other types of protection are available for special problems. These include dry chemicals, mechanical foam, water fog, and CO_2, which are generally installed for spot protection at especially-hazardous locations. Where special hazards exist, insurance companies may require spot protection in addition to sprinklers in the rest of the plant. But it's the installation of sprinklers throughout a plant, not merely covering a special hazard, that brings lower insurance premiums. It's a sound investment every way you look at it.

MAIN CONTROLS: Sprinkler system is fed through central valves, as in this layout at Allis-Chalmers tractor plant, LaCrosse, Wis.

Typical Sprinkler Savings

Type of Business	ANNUAL INSURANCE COST Before Sprinklers	After Installing Sprinklers	Sprinkler System Cost	Annual Savings
Machine Shop, Massachusetts	$ 864	$ 139	$ 5,828	$ 725
Warehouse, Virginia	2,316	345	4,788	1,971
Insulation Mfr., New Jersey	8,077	1,362	25,800	6,715
Metalworking Plant, Texas	3,600	280	10,000	3,320
Metal Furniture Mfr. Missouri	9,300	6,500	17,500	2,800

Acid Etch-Milling Is In Full-Scale Production

By T. M. Rohan—Cleveland Regional Editor

Take a closer look at chemical milling: It's grown up—and growing bigger.

Aluminum came first. Now the accent's on high alloy steels and titanium.

▪ There's a new look in chemical milling. Inventive plane-makers have lifted this offshoot of the engraver's art out of the odd-job category and made it an important tool of production.

Regular runs on aluminum tube, sheet and forgings are now routine at North American Aviation's Columbus, O., jet-fighter plant. And that's only the beginning: Research there is already aimed at more etch-resistant metals like alloy and stainless steels, ultra-high alloy steels—even titanium. Results to date look good; all these tougher materials have been etch-milled successfully in trial runs.

Where the Columbus plant applied a new twist to etch-milling is in the use of hydrochloric acid as a production etchant. Acid baths are made by introducing gaseous HCl into the solution. This provides a simple, effective way to hold acid concentration at the desired level. North American's Los Angeles plant, which announced the original Chem-Mill process in 1955, continues to base parallel production on strong alkaline etchants.

Etch Rate Constant — Basic working data at Columbus are the etch rates, or depth of materials etched out in a given period. For consistent operation the acid temperature, solution strength and other factors are controlled and adjusted to hold a constant etch rate of 1 mil (0.001 in.) per minute. This gives the best surface finish.

Etch-milling of 75S aluminum can be done at room temperature. It requires some cooling of the solution, since all etching reactions are exothermic. Several wetting agents, buffers and inhibitors are also

MASKED FOR MILLING: Protective coating is stripped from areas to be etched. Production runs on aircraft parts are already routine.

PLANE PARTS ETCHING: Access door for F-100 fighter goes through etch milling line. Etch rate is held to constant 1 mil per minute.

added. Other aluminums attain their optimum rate at about 115-125°F. The maximum rate achieved so far has been 4 mils per minute.

Plans have already been laid at Columbus to mill something like 400 aluminum parts on a single airplane by the new process. These will include tapered fuselage skins, access doors, duct skins and leading edges of wings and stabilizers. On a landing-gear door alone, chemical milling reduces total weight by 11 lb without affecting structural strength.

Eliminates Dimples—One intake duct on a current jet-fighter model is made up of 18 chemically-milled parts. Because this unit formerly had to be made of light-gage sheet, dimples around drilled holes couldn't be removed. With chemical milling the parts are made of heavier-gage material, which permits countersinking the holes to eliminate dimpling. Low-stress areas are etched away, leaving the part stronger than before at high stress points with no net increase in weight.

Skins and tubing are tapered either by lowering pieces into the bath at a predetermined rate or by gradually filling the tank with pieces in place. Hundreds of shims have been made by simply lowering strip into the bath to get a taper, then cutting it into the desired sizes.

Press forgings get the equivalent of a rough cut by mass-immersing them in baskets to etch off about 1/16 in. of surface. These parts usually don't need masking, so the process is fast and economical. Sand castings aren't etch-milled. Because of their porosity, they soak up solution and continue etching indefinitely.

Titanium remains the roughest material tried to date. While stronger acids must be used, the process has proved economically feasible for a majority of parts. Most of the runs so far have been on titanium sheet, but some forgings have been done. Because shapes almost impossible to machine can be etched, chemical milling is expected to greatly widen the aero industry's use of titanium.

Three-Way Savings—The cost of chemical milling varies with complexity of the part and depth of cut. Some pieces are being etch-milled at one-fourth the cost of equivalent stock removal by mechanical milling.

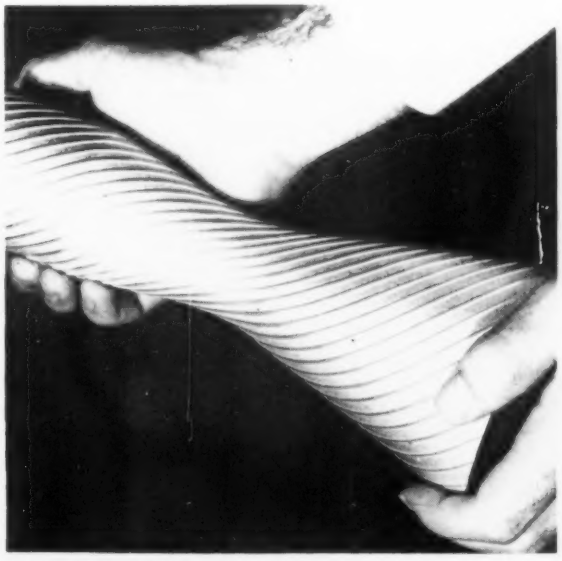
New methods for recovery of dissolved aluminum as a saleable chloride promise to cut costs even more. This is being tried on a new installation at Columbus in which 18-ft long tanks will be used with the present 10-ft series. Aluminum salts of this type find a ready market as aluminum melting flux, for petroleum cracking and in manufacture of wet-strength paper. A pound of dissolved aluminum yields about 5 lb of aluminum chloride.

Chemical milling provides still another benefit that may be reflected in costs: It shows up inclusions and other sub-surface flaws which might not be found in normal inspection.

But chemical milling's chief talent is still its ability to remove excess metal from out-of-the-way spots without endangering part strength. This applies whether the metal is aluminum, stainless steel, or titanium.

The process was awarded a basic U. S. patent last year and has since been made available to other producers of aircraft and missiles. Procedures, controls and necessary supplies are currently obtainable through Turco Products Co., Los Angeles, whom North American has given the right to sublicense.

LIGHT BUT STRONG: Higher strength-weight ratios are obtained by using heavier-gage sheet and etching away areas of lowest stress.



CHEMICALLY CUT: Spiral grooves on rocket engine part were formed by acid-etch method. Complex shapes are where it excels.

Guide To Better High-Temperature Brazing

By W. Feduska—Materials Engineering Dept., Westinghouse Electric Corp., East Pittsburgh, Pa.

Good high-temperature brazing is no accident. It's the proper combination of essentials.

Choosing the right brazing alloy is a starting point. Proper heating rate and wise choice of protective atmosphere are also important.

▪ High-temperature alloy brazing is a fluxless method of metal joining. It involves the fusion of nonferrous brazing alloys with base metals having far higher melting points.

Newest of the modern joining techniques, it promises both metallurgical and economic advantages not obtainable by other joining methods.

Best Results — In brazing high-temperature alloys, for example, it permits brazing numerous complex parts in a single operation. Parts thus joined are essentially free from distortion and cracking.

For best results, high-temperature brazing alloys should meet three basic requirements:

(1) They should melt in the range of 1850° to 2200°F.

(2) They should produce good wettability—the ability to spread over a base metal surface while superficially diffusing into, and alloying with it.

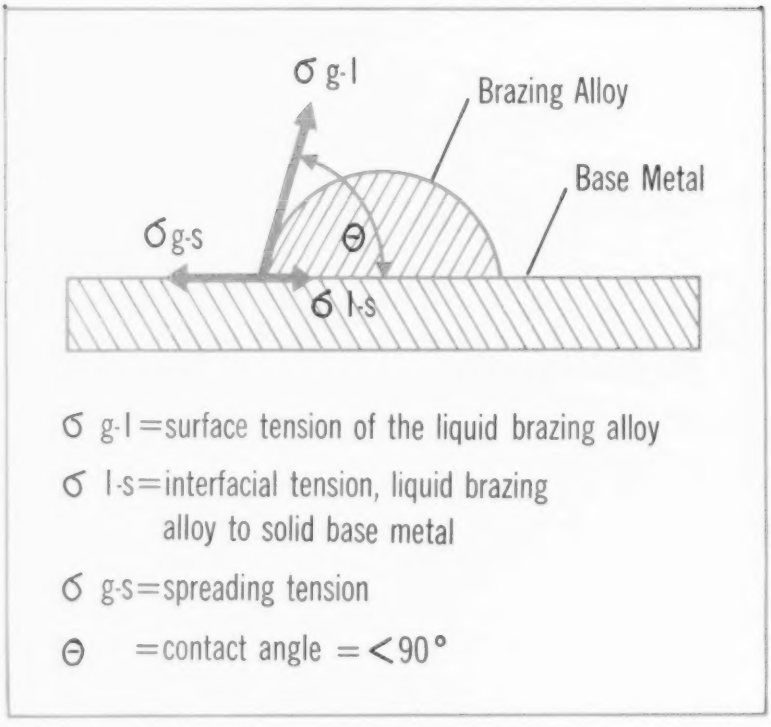
(3) They should have oxidation and corrosion resistance comparable to the high-temperature alloys being joined.

Alloy Changes — The chemical composition of a high-temperature brazing alloy is both unusual and transient. Transient, because it is altered during the brazing reaction.

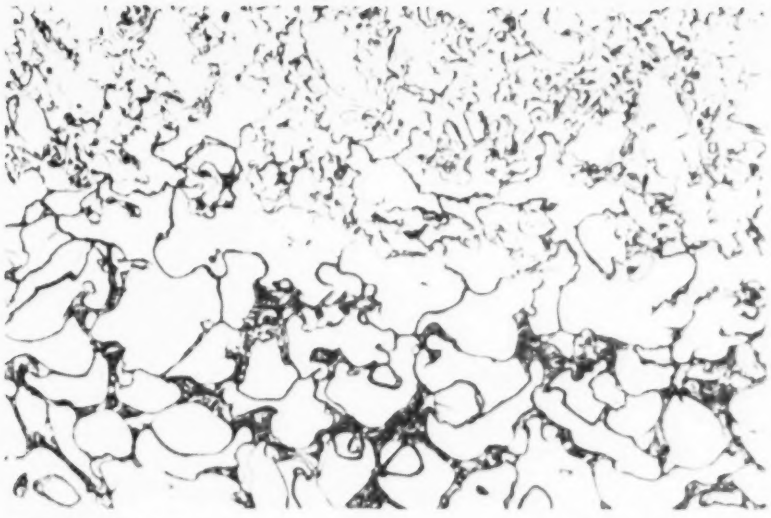
The brazing alloy composition and structure after brazing depend on the nature and extent of interdiffusion between brazing alloy and base metal. This ultimate composition may be altered by variations in diffusion rates produced by superheating, by time at temperature, and by composition of the base metal.

Close Range—To avoid excessive fusion and overheating of the base metal during brazing, high-temperature brazing alloys must melt within a fairly narrow temperature range (1850-2200°F). Eutectic or near-eutectic compositions must be selected to get base compositions that approach this melting range. When required, additional elements must be added to further lower the melting temperature.

Nickel is usually selected as a base for these brazing alloys. There are a number of nickel-binary eutectics which have relatively low melting points (under 2550°F).


σ g-l
Brazing Alloy
Base Metal
σ g-s
Θ
σ l-s
σ g-l = surface tension of the liquid brazing alloy
σ l-s = interfacial tension, liquid brazing alloy to solid base metal
σ g-s = spreading tension
Θ = contact angle = <90°

FORCE SYSTEM: Affects wettability as shown above. Wettability refers to spreading of brazing alloy over base metal.



AFTER COOLING: Solid solution decomposes and forms a different composition. Here the final solution is shown in a eutectoid matrix.

DIFFUSION: Photomicrograph shows grain boundary diffusion and reaction product formed in brazing Inconel X with Coast Metals 52 alloy.

Such alloys can also be expected to bond with iron, chromium, cobalt, molybdenum, and nickel-base alloys to form nickel-rich solid solutions at the brazed joint interface.

Other Elements—Additional elements are added to the binary composition to produce a composition having a melting range within 1850-2200°F. Elements added to nickel to make up high-temperature brazing alloys include chromium, silicon, phosphorus, carbon, and boron. Gold and cobalt have been used to a limited extent.

Some of the available types of commercial high-temperature brazing alloys are listed in Table 1. The first important commercial alloy of this group was Nicrobraz.

This alloy was actually developed for use as a hard-facing material. It was eventually used in high-temperature brazing because its composition and relatively low melting temperature range appeared favorable. To date, it remains one of the most commonly used types, along with the Ni-Cr-Si and Ni-Si-B alloys.

Wide Selection—There are now available suitable alloys for brazing ferritic and austenitic stainless steels, molybdenum, and superalloys free of titanium. For superalloys containing titanium, as well as pure titanium and titanium alloys, fluxless high-temperature brazing may be impractical or impossible where replacing techniques cannot be used.

Many heat-resisting alloys are hardened by means of titanium additions. These tend to form a titanium-containing film during brazing.

Harmful Film—Once this tenacious surface film is formed, initial wetting and subsequent spreading of the liquid brazing alloy over the base metal surface are retarded. Attempts to eliminate, or at least slow up, formation of this film in vacuum, dry helium, or dry hydrogen have been unsuccessful.

Effective Heating—High-temperature brazing is usually done in retorts installed in resistance furnaces under controlled atmosphere. Induction heating units are also used, with special provisions for controlled atmosphere.

Brazing atmospheres are either reducing or inert. Dry hydrogen with a dew point of —50°C is the most commonly used reducing atmosphere. Dissociated ammonia is also used. Inert atmospheres that have proved successful include argon and dry helium. Vacuum (at about one micron) has been introduced to commercial practice.

Check Economics—For most applications, final selection of heating method and atmosphere depend primarily upon the technical and economic aspects of the particular brazing problem.

Of the various factors that are likely to affect brazing, wettability is among the more important. The usual force system affecting wettability is shown on p. 116.

TABLE 1

Some Commercial High Temperature Brazing Alloys

Type:	Ni Cr Si B	Ni Si B	Ni Cr Si	Ni P	Ag Mn
	Nicobraz Rexweld 64 Coast Metals No. 53 Coast Metals No. 56	Coast Metals No. 51 Coast Metals No. 52 Nicobraz 130	Vasco #1 Vasco #2 G. E. 81	Nicobraz No. 10	Ag 15 Mn
Melting Range (Approx.)	950-1025°C (1742-1877°F)	975-1075°C (1787-1967°F)	1075-1130°C (1967-2066°F)	900°C (1652°F)	950-960°C (1742-1760°F)

Surface Tension—Spreading ability of brazing alloys depends upon achieving a high surface tension. This means maintaining a relatively low brazing alloy surface tension and a low interfacial tension between the liquid brazing alloy and the base metal.

Liquid brazing alloy surface tension stems directly from composition. Indirectly, it is affected by temperature and atmosphere. Interfacial tension is dependent upon reaction. It increases as the tendency for superficial diffusion and alloying between brazing alloy and base metal increases.

Superficial alloying increases when the brazing alloy contains elements which promote formation by diffusion of solid solutions and intermetallic compounds. The presence of interstitial elements such as boron and carbon, or elements of relatively small atomic radii such as silicon, accelerate superficial alloying and compound formation.

No Penetration — The surface film that forms in the presence of titanium can actually cause a "dewetting" of the liquid brazing alloy under some conditions. Liquid brazing alloy of high fluidity may rapidly spread over the base metal surface at brazing temperature. But it would be unable to penetrate the titanium - compound surface film which forms on the base metal at brazing temperature.

Other factors also affect brazing. When brazing alloys of wide-melting range are used, heating rates become critical. Slow rates of heating permit liquation and "run off" of lower-melting constituents. The remaining high-melting constituents are then unable to melt and may remain unfused at the joint fillet region.

Retards Wetting—Superheat, or increased brazing temperature above the liquid phase of the brazing alloy, will usually cause increased base metal alloying. This may actually retard wetting.

When thin sections are to be joined, superheat is extremely critical. Complete perforation of the section by the brazing alloy may result when the brazing temperature is increased excessively.

Joint clearances and surface roughness conditions are also significant factors in brazing. Maximum sheer strengths are usually obtained at minimum joint clearances.

Aging has little effect on the microstructures produced by brazing, other than to slightly promote general diffusion. For this reason, post-brazing heat treatments may not be helpful in modifying existing structures.

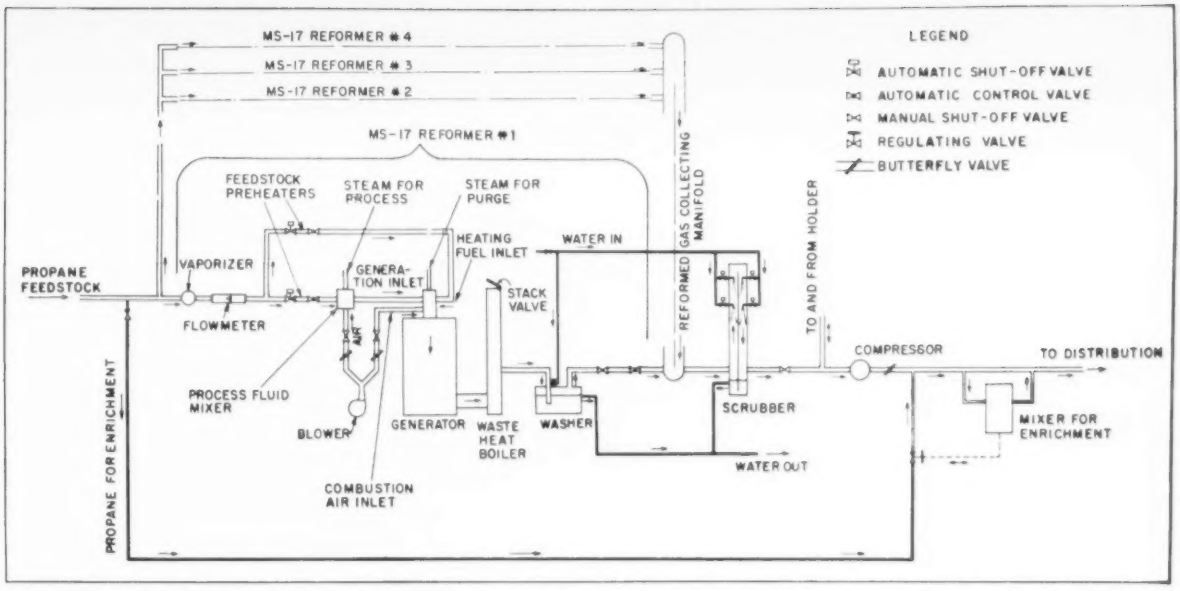
Future Needs—Looking to the future, brazing alloys should be designed for good wettability, strong bonding characteristics, high strength, and suitable corrosion resistance.

To improve wettability and flow, eutectic or near-eutectic compositions should be used. These characteristics might also be improved by addition-elements that will lower the surface tension of the liquid brazing alloy.

Good interface bonding should result from balanced brazing alloy compositions. Such compositions should contain proper amounts of interstitial elements so that diffusion and alloying can occur without excessive grain boundary penetration and reaction.

These alloys should also contain other elements which will permit general inter-diffusion and solid solution formation at the interface. This combination of alloying elements should result in a better brazed joint. Current development work at Westinghouse is evaluating alloy factors as well as the mechanical aspects of brazing.

The ultimate goal is to establish a basis whereby brazing alloys can be designed for specific high-temperature base metals. Then brazing itself may truly become a controlled metallurgical operation.



PROCESS DIAGRAM: Layout of a 4-unit system for propane feedstock and propane enrichment.

New Unit Reforms Gas For Metal Processing

It's a gas generating system small enough for individual plant use.

You can reform refinery or liquid petroleum gas to get high grade fuel.

Completely automatic process gives continuous flow. Thermal efficiency is high.

▪ Metalworking plants that use combustible fuels for metal processing now have another source. A new gas generating unit produces fuels of manufactured-gas quality by reforming refinery and liquid petroleum gas. It's ideal for remote locations.

Control of gas characteristics makes the process suitable for heat-treating and other applications.

The automatic process requires little attention. Capacity for a single unit is two million cubic feet per day.

Here's How—In the generating cycle, feedstock, air, and steam flow down over a nickel-bearing catalytic bed. The resulting gas is scrubbed and blended to specification.

A steam purge transforms any free carbon into gas constituents.

In the heating cycle, combustion of feedstock and air brings the catalytic bed back to temperature. You can use an excess of air to oxidize any sulphur left from the generating cycle. A final steam purge is used before the generating cycle repeats.

Automatic Control—Control of the unit, known as the MS 17 Micro-Simplex process, is both by time cycle and pyrometry. A series of commutator-type disks control pilot valves.

You can control each of the following separately: (1) cracking temperature, (2) time of contact of gases in catalytic bed, (3) air-to-feedstock ratio, and (4) steam-to-feedstock ratio.

Enrichment—Where heating values are up to 472 Btu per cu ft, you can get higher heating values through enrichment. The high hydrogen content and low nitrogen dilution are excellent for heat-treating applications.

Waste heat boiler steam can be used effectively. Thermal efficiency is up to 78 pct without enrichment.

The process is being introduced by the Gas Machinery Co., Cleveland, in cooperation with Stein & Roubaix of Paris, France.

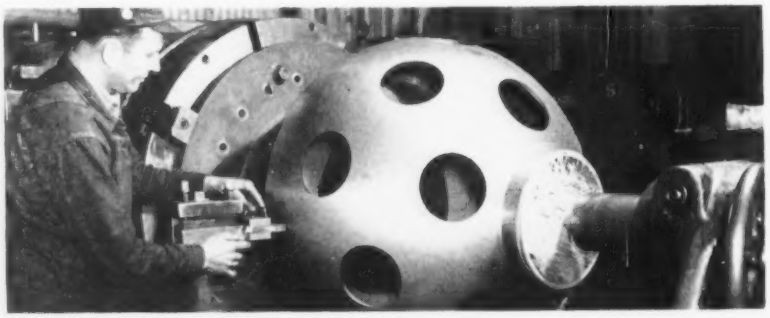
How Castings Hold Dimensional Stability

By F. C. Benz—Director, Engineering Service Dept., Meehanite Metal Corp., New Rochelle, N. Y.

One way to get better performance in engineered products is to hold closer tolerances. Another is to use materials which have good dimensional stability.

In this regard, where do castings stand?

Here are the results of a seven-year study on Meehanite's ability to hold its dimensions.



HOLDS ITS SHAPE: Cast-in-Meehanite parts like this planetarium projector ball maintain their form better during machining.

▪ With most modern engineering components, ability to hold accuracy of dimension takes top priority. This is particularly true where castings may be complex in form, involve abrupt sectional changes, or be subject to machining at maximum speeds and feeds producing internal stresses. Stress release then—whether gradual or rapid—means dimensional changes, distortion, perhaps cracking.

Thus, a knowledge of contraction characteristics of the casting material becomes important. Investigations made on as-cast, stress-relieved and hardened Meehanite metal test bars fully confirm the material's ability to retain stability in service.

Meehanite test bars 9-in. in length (1-in. diam) changed less than 0.0001-in. in length over a 7-year test period.

The Problem—When cast iron or steel cools from solidification to room temperature it contracts. But at the critical carbide change (1350° to 1450° F) there occurs a marked expansion, followed again by normal contraction to room temperature. Shown in Fig. 1, this may be termed the reverse dimensional changes of a casting.

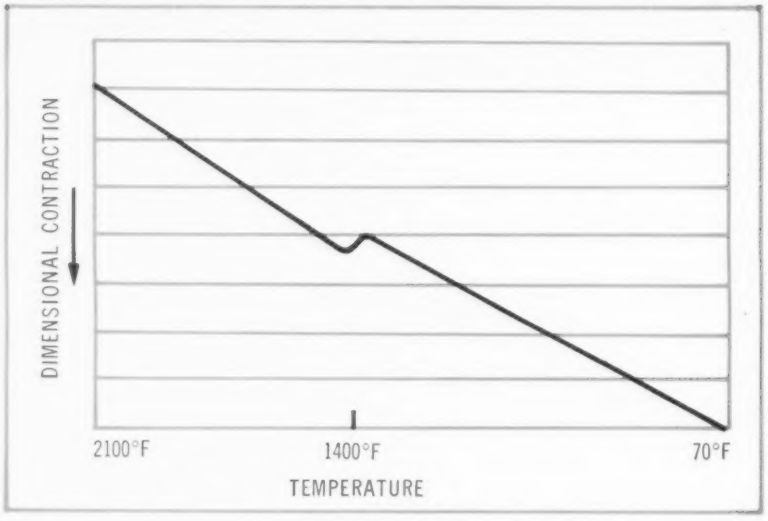


FIG. 1: Expansion and contraction curve shows effects of temperature on steel and iron as they cool from casting temperature.

Generally, foundries count on the shrinkage allowance for patterns to compensate for the change in dimension by shrinkage. But no allowance is possible for the carbide expansion. Therefore, all iron and steel castings suffering these dimensional changes must contain internal stresses. These vary in magnitude according to the complexity of contraction and expansion involved.

Allowance Varies—The shrinkage allowance may be low (⅛ in. per ft) as in gray cast iron, or high (¼ in. per ft) in steel. Where the design is complex, this contraction

is serious and may cause distortion or cracking. Where the casting stresses do not reveal themselves, dimensional changes occur on machining of the casting or in its use at a later date.

These depend on the intensity of the pent-up stresses.

Where a component is subject to temperature influences, the coefficient of thermal expansion and contraction of the metal is a matter for serious consideration. Some metals are more sensitive to those temperature influences that cause dimensional inaccuracies than others. Materials possessing an equiaxed crystalline structure, Fig. 2, are more stable than those exhibiting unbalanced crystal grains that have greater length than width.

Getting Around It—You can't eliminate normal expansion and contraction changes in the manufacture of commercial castings. But you can reduce casting strain by taking such precautions as:

1. Selecting a material having minimum shrinkage allowance.
2. Simplifying casting design to avoid wherever possible radical departures in section, re-entrant angles, and multiplicity of cores.
3. Employing foundry techniques that help provide uniform cooling condition.
4. Avoiding fast or uneven cooling in shakeout.
5. Providing for adequate stress relief anneal.

Machining Aspects—Several factors influence distortion during or after machining. These include:

(1) Method of clamping. This applies particularly to open shapes that can be readily distorted. (2) High cutting face. It is recommended to complete roughing cut before starting light finishing cuts. (3) Local generation of heat caused by using excessively heavy cuts. (4) Machine tool inaccuracies.

Until the skin of a casting is broken, it is usually in a stable condition unless casting stresses are excessive. As soon as machining breaks the skin, the casting "moves" until it again attains a position where the stresses are in a state of equilibrium. It may remain in this position until another cut is made.

For this reason stress relief by annealing is best done after rough machining is completed—although it is more effective in most cases if done before machining.

Aging's No Help—There is no way to predict the manner in which a complex casting will "move" except by trial and error. Aging or "weathering" of castings over long periods of time to permit the casting to regain stability has no merit. This method can never eliminate all the casting stresses.

To permit release of internal stresses resulting from various rates of cooling during solidification and from cooling of the solid casting, stress relief treatment is recommended. For these treatments, castings are charged into a furnace for slow heating. It is important to control the stress relief anneal temperature in order to assure dimensional stability.

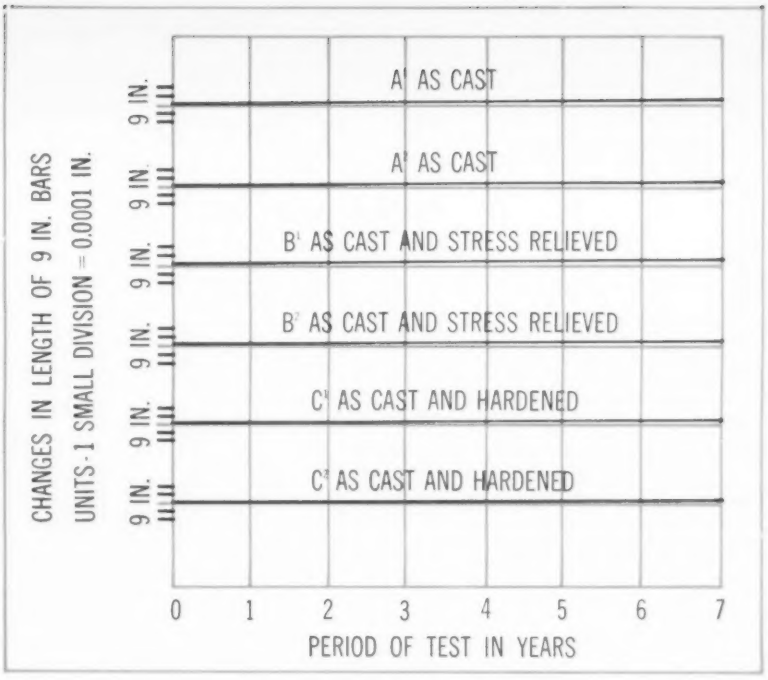


FIG. 2: Graph shows how little test bars have changed after seven years' time. Change amounts to less than 0.0001-in. on the 9-in. bar.

Recommended temperatures are 1000°F for gray cast iron and Type GE-GD Meehanite; 1100°F for Type GC-GB Meehanite and 1150°F for Type GA-GM Meehanite.

Test Objectives — Investigations made on Meehanite in the as-cast, annealed, and heat treated conditions were aimed at defining the degree of stability inherent in the material over a selected period of time. Test bars measured 9 in. long by 1 in. diam. They were ground and lapped to facilitate precise measurements. Curves were plotted on the following bars:

A^1 and A^2—as cast.

B^1 and B^2—stress relieved at 1100°F for 4 hours.

C^1 and C^2—hardened by oil quenching from 1600°F and drawing for two hours.

The lengths of the bars were accurately measured to 0.0001-in. immediately before conducting the tests. Changes in bar length after 7 years are shown in Fig. 2. In each case it's less than 0.0001 in.

COMPACT UNIT: Equipment for lap welding seams on tunnel's bottom sections is compact and readily portable. The unit consists of a power supply, water cooling apparatus, CO_2 tanks and rod feed motor.

Welding With CO_2 Speeds A Tunnel Project

Where can you cut the time on a large construction job? Actually, there aren't many areas, but welding is certainly one.

Here's how it was put to work effectively on a major tunnel project.

▪ Metal arc welding, using CO_2 as a shielding gas, is finding its way into large-scale construction jobs. One of its most recent uses is on the four-lane, 1,500-ft tunnel under the entrance of Havana harbor.

Build In Sections—The tunnel is being built in five sections, each about 350 ft long, 72 ft wide and 23 ft high, weighing about 18,000 tons. The reinforced concrete sections are prestressed after setting by longitudinal and transverse cables.

Two sections at a time are constructed in an excavated dry dock carved out of the rock at the job site. The finished sections are then floated out to make room for the construction of the next two.

Welding Here—Steel plate lines the bottom of each tunnel section. This 5/32-in. plate serves to protect the concrete and makes a water-tight form where the concrete can be poured.

The bottoms are composed of 270 sheets, roughly 4 ft wide by 25 ft long. These are welded into larger panels, which are stacked near the edge of the dry dock. Cranes lift the larger panels directly into position to form bottoms.

Saves Time—The panels of the bottom are lap welded with the Air Reduction Co. metal arc welding process using CO_2 shielding. You can see the savings in time where six welders in three shifts complete two bottoms in ten days. It takes 12 welders 14 days to do the same work with stick electrodes.

The Aircomatic metal arc process is also used to weld 5000 steel pieces on each bottom to anchor the concrete.

Portable Unit—Power supplies and water coolers are arranged in a carriage with CO_2 bottles. The carriage forms a compact unit which can be moved easily.

The two Aircomatic guns in 200 hours of intermittent use welded about 9000 linear ft., consuming 900 lbs of 1/16 in. steel wire.

Subcontractor for the fabrication of the steel bottoms is Mecanizadoro Agro - Industrial Lamadrid, S.A., Cuba.

IN ELECTRICWARE, TOO,

Sharonsteel Quality STANDS OUT

- There are so many advantages to stainless electricware it's no surprise that sales are skyrocketing. Homemakers like the natural beauty of stainless — the way it easily absorbs the punishment of everyday use and stays forever new with a minimum of care.
- Sharon's thorough knowledge of the utensil industry, the ability to produce specification steels of consistent uniformity, plus the finest finishes in the industry are reasons why so many of the nation's leading electricware manufacturers specify **Sharon Quality Stainless Steels.**

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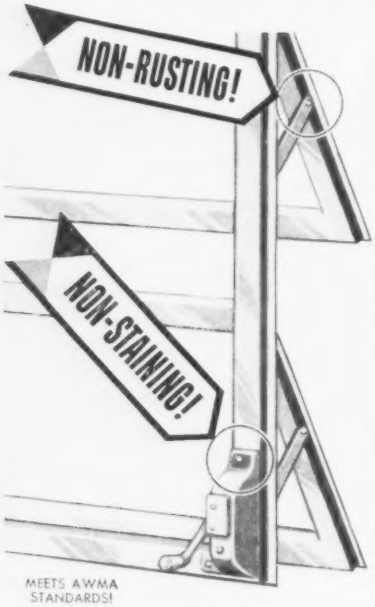
SHARONSTEEL

For 56 Years a Quality Name in Steel

SHARON STEEL CORPORATION, SHARON, PENNA.

CHICAGO, CINCINNATI, CLEVELAND, DAYTON, DETROIT, GRAND RAPIDS, INDIANAPOLIS, LOS ANGELES, MILWAUKEE, NEW YORK, PHILADELPHIA, ROCHESTER, SAN FRANCISCO, SHARON, MONTREAL, TORONTO

How Alcoa Aluminum Fasteners make good windows even better



You can meet the highest standards of quality and the specifications of the AWMA (Aluminum Window Manufacturers Association) for prime windows of aluminum when you assemble with Alcoa® Aluminum Fasteners. Perfect color match and protection against both galvanic and atmospheric corrosion make for lasting good looks . . . consumer satisfaction. Complete stocks carried by your local Alcoa distributor fill every requirement. He is listed in the Yellow Pages of your telephone directory.

ALCOA ALUMINUM FASTENERS

Your Guide to the Best in Aluminum Value

THE ALCOA HOUR

Fill out coupon for facts, samples

Aluminum Company of America
2243-E Alcoa Bldg., Pittsburgh 19, Pa.
Gentlemen: Please send complete specification data and samples of Alcoa Aluminum Fasteners.

Name

Title

Company

Address

FREE TECHNICAL LITERATURE

New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, p. 129.

Aluminum Bus

Properties and uses of aluminum bus conductor are discussed in a complete handbook. The 280-page work contains 69 illustrations. (For free copy write on company letterhead to Aluminum Co. of America, 793 Alcoa Bldg., Pittsburgh 19, Pa.)

Battery Power

Batteries used in electric industrial trucks and mine vehicles are discussed in a dozen-page publication. (Exide Industrial Div., The Electric Storage Battery Co.)

For free copy circle No. 1 on postcard, p. 129

Snap Coupling

Quick-connect, quick-disconnect "HK" couplings are described in a data sheet. (Snap-Tite, Inc.)

For free copy circle No. 2 on postcard, p. 129

Hose Ends, Assemblies

Hose ends and assemblies are listed in a 40-page catalog. It gives data on bulk industrial hose, permanently attached hose assemblies, swaged hose assemblies and ends, hose end swivel adapters, assembly instructions and installation data. (The Weatherhead Co.)

For free copy circle No. 3 on postcard, p. 129

Electrolytic Grinder

An electrolytic oscillating tool grinder and a chip breaker grinder are described in a bulletin. (Hammond Machinery Builders, Inc.)

For free copy circle No. 4 on postcard, p. 129

Weather-proof Motor

Features which contribute to the outdoor dependability of weather-protected motors in ratings from 250 to 900 hp are described in a new bulletin. (Allis-Chalmers Mfg. Co.)

For free copy circle No. 5 on postcard, p. 129

Boiler Cleaning

Vacuum cleaning equipment for boiler cleaning is described in a bulletin. It covers both stationary and portable equipment. (The Spencer Turbine Co.)

For free copy circle No. 6 on postcard, p. 129

Analyzers

Containing 24-pages, a brochure describes excitation source units and discharge stands used in spectro-chemical analysis. (Jarrell-Ash Co.)

For free copy circle No. 7 on postcard, p. 129

Barrel Finishing

Barrel finishing case histories appear in a publication. It discusses a comparatively new process. (Minnesota Mining and Mfg. Co.)

For free copy circle No. 8 on postcard, p. 129

Hole Key

Zero concentricity in a matter of seconds for lathe fixtures

mounted on slotted face plates is possible with a new eccentric fixture key. So states a manufacturer's reading matter. The key is a fully adjustable reamed hole fixture. (Ace Drill Bushing Co. Inc.)

For free copy circle No. 9 on postcard p. 129

Drill, Reamer Care

"Care of Drills and Reamers" offers technical data of using, sharpening and handling drills and reamers made of high speed or carbide steel. It has 22 pages. (Chicago-Latrobe.)

For free copy circle No. 10 on postcard p. 129

Fork Truck

Gas-powered 3000-lb capacity fork trucks are described in a 6-page brochure. (Clark Equipment Co.)

For free copy circle No. 11 on postcard p. 129

Stainless Fastenings

Many new sizes and types of stainless steel fastenings, hinges and screw machine products appear in a firm's 24-page catalog. It lists over 7,000 items. (Star Stainless Screw Co.)

For free copy circle No. 12 on postcard p. 129

Switches

A trio of data sheets cover switches. They describe: a "rocket" switch, alternate action pushbutton switches, and a "typewriter" push-button switch. (Micro Switch Div., Minneapolis - Honeywell Regulator Co.)

For free copy circle No. 13 on postcard p. 129

Titanium Pipe

A folder discusses seamless titanium metal pipe and tubing. (Tubular Products Div., Babcock & Wilcox Co.)

For free copy circle No. 14 on postcard p. 129

Steel Progress

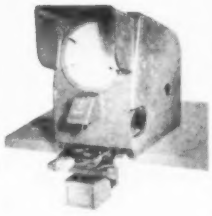
Recent progress of the steel industry is reviewed in a firm's annual digest of technical papers. The

PRECISION PRODUCTION PROBLEMS ?

Here's help from Bausch & Lomb in TOOL DESIGN INSPECTION FABRICATION MEASURING TESTING

NEW! ALIGNMENT INTERFEROMETER

Accurately measures small changes in angle over a range of 30 seconds of arc (±15 seconds). Easy direct scale readings to 0.2 seconds (0.000006").



BENCH COMPARATOR

Exclusive understage illumination—no complex set-ups, no holding fixtures for most work. Magnified silhouettes show errors instantly. Reads to 0.0001" with optional micrometer stage.

STEREO-MICROSCOPES

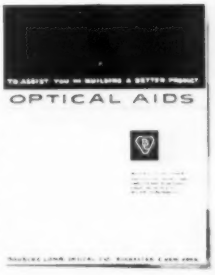
Magnified 3-D views of tiny parts. Dustproof, shockproof, can be mounted right in machine or fixture. Speeds assembly, inspection. Most complete line, widest field of view.

CONTOUR MEASURING PROJECTOR

Shows magnified silhouettes or surface views. Simple operation, highest precision measurements: to 0.0001", linear; to 1 minute of arc, angular.

OPTICAL AIDS CATALOG

Time-and-money-saving data on Surface Comparators, Industrial Magnifiers, Macroscopes, Microscope Bodies, Micrometer Discs, Wide Field Tubes, Brinell Microscopes, Shop Microscopes.



NEW TOOLMAKER'S MEASURING MICROSCOPE

Quickly measures opaque or transparent objects of any contour. Linear, accurate to 0.0001"; angular, to 1 minute of arc.

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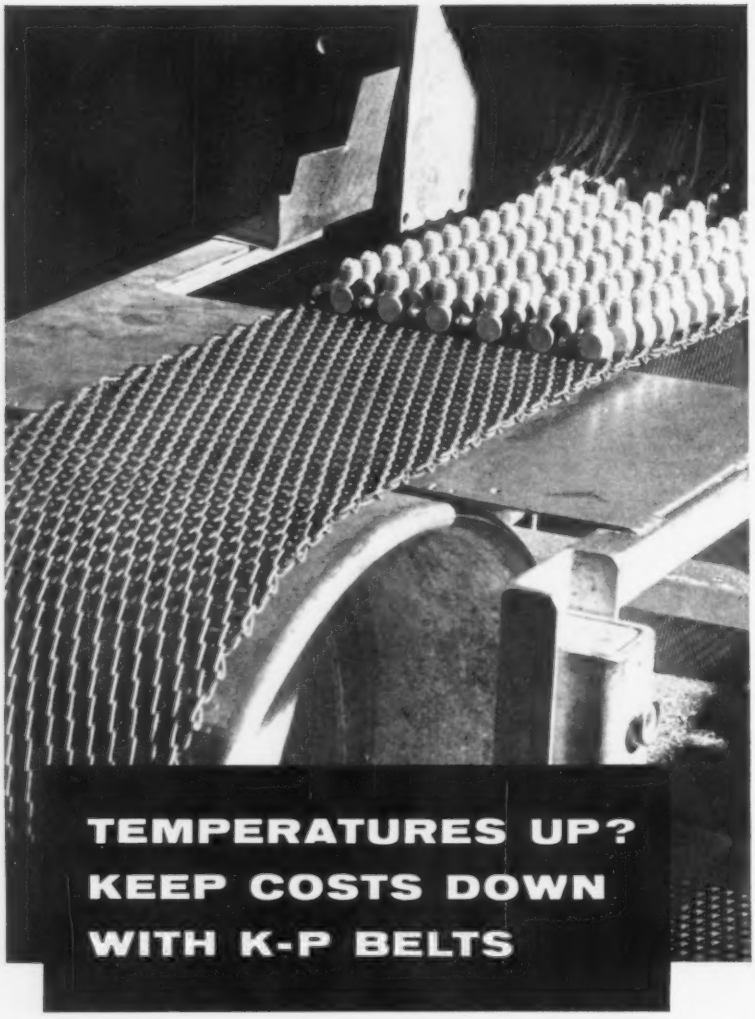
BAUSCH & LOMB OPTICAL CO.
85217 St. Paul St., Rochester 2, N. Y.

Please send literature on optical production aids checked below:

☐ Alignment Interferometer ☐ Bench Comparator ☐ Contour Measuring Projector ☐ Toolmaker's Microscope ☐ Stereomicroscopes ☐ Optical Aids Catalog

NAME .....
TITLE .....
COMPANY .....
ADDRESS .....
CITY ..... ZONE ..... STATE .....

BAUSCH & LOMB
SINCE B&L 1853



This Korb-Pettit woven wire belt is used for copper brazing at 2050°F. Proper design and alloy selection help keep operating costs at a minimum.

Whether your processing involves brazing heat, subzero cold, corrosive action of gases and liquids, or other destructive forces, a Korb-Pettit custom-engineered woven wire conveyor belt will meet your needs.

K-P woven wire belts are available in a wide variety of alloys, in standard and special constructions, with mesh openings from 1/64" to 3". Their flexibility, strength, and draining and circulating characteristics meet the demands of conveying materials larger than 1/64".

To find out how Korb-Pettit belts and other Hewitt-Robins products and services can help you, consult your classified telephone directory for the nearest H-R representative, or contact Hewitt-Robins, Stamford, Connecticut.

HR HEWITT-ROBINS

CONVEYOR BELTING AND IDLERS...POWER TRANSMISSION DRIVES
INDUSTRIAL HOSE...VIBRATING CONVEYORS, SCREENS & SHAKEOUTS

FREE LITERATURE

booklet lists 61 reports, articles, and talks prepared in 1956 by scientific and administrative personnel of the corporation. (United States Steel Corp.)

For free copy circle No. 15 on postcard p. 129

Motor Control

Compactly designed, a general-purpose motor control center permits savings up to 50-pct in floor area. It's the subject of a revised 24-page bulletin. (General Electric Co., Distribution Assemblies Dept.)

For free copy circle No. 16 on postcard p. 129

Air, Hydraulic Units

Pocket-size, an 18-page booklet on air and hydraulic devices tells how to install hydraulic and pneumatic systems. It gives the do's and don'ts in making an installation. (Logansport Machine Co., Inc.)

For free copy circle No. 17 on postcard p. 129

Conveyor Pulleys

Welded steel conveyor pulleys for belt conveyor and bucket elevator systems are covered in a bulletin. (Chain Belt Co.)

For free copy circle No. 18 on postcard p. 129

Blast Cleaner

Two 12-page catalogs detail 7 and 14 cu ft capacity, high-speed, low-cost cleaning machines. They handle castings, forgings, weldments, heat treated parts, and other metal products. (Wheelabrator Corp.)

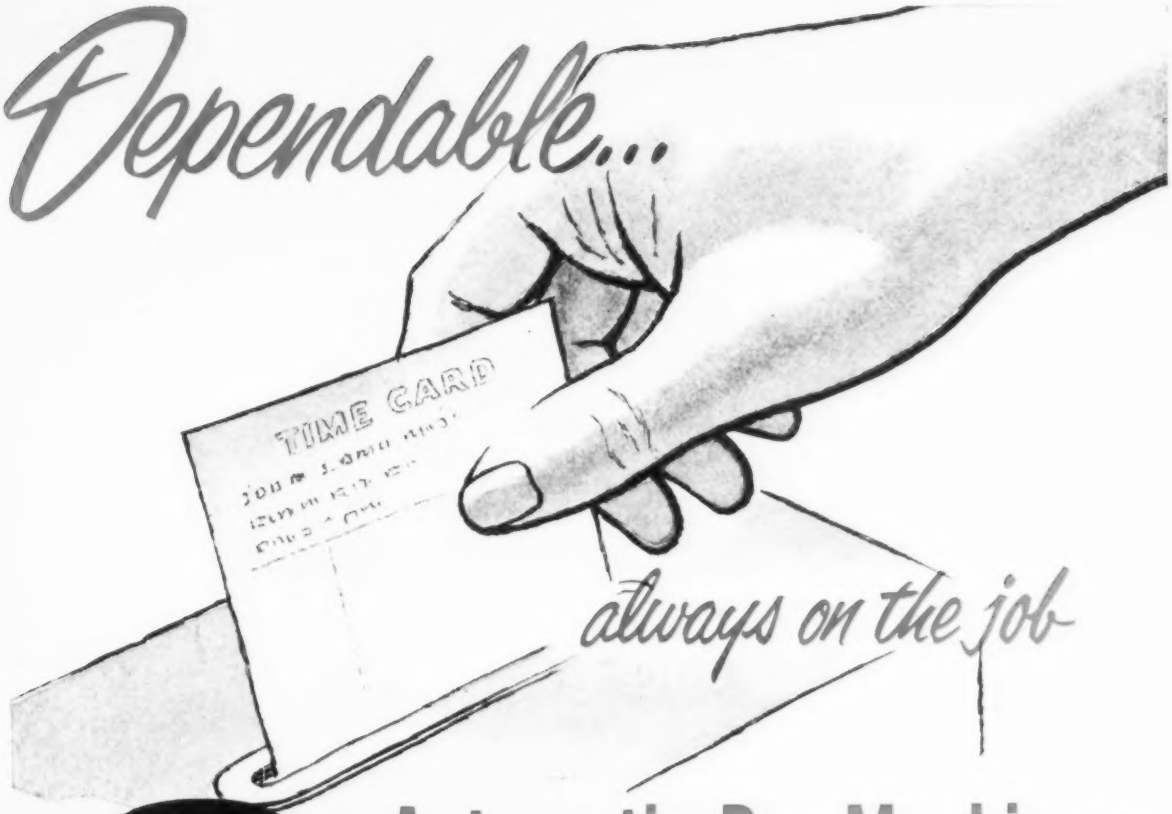
For free copy circle No. 19 on postcard p. 129

Fuses

New current-limiting fuses appear in an 8-page bulletin. These fuses are capable of interrupting short circuit currents up to 200,000-rms symmetrical amperes. (General Electric Co.)

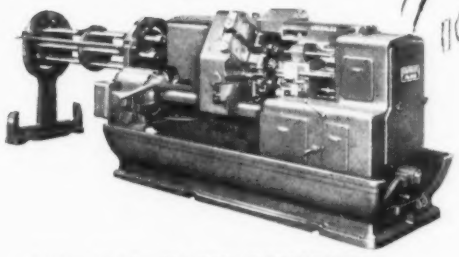
For free copy circle No. 20 on postcard p. 129

Dependable...



PRODUCTION MACHINERY

GREENLEE Automatic Bar Machines



SIX AND FOUR-SPINDLE AUTOMATIC BAR MACHINES

GREENLEE Special Machine Tools

- Multiple-Spindle Drilling and Tapping Machines
- Transfer-Type Processing Machines
- Hydro-Borer Precision Boring Machines

BOOST PRODUCTION
REDUCE DOWN TIME

It's easy to maintain rigid production schedules . . . prevent costly bottlenecks with Greenlee Bar Automatics. They are always on the job . . . give continuous, reliable service.

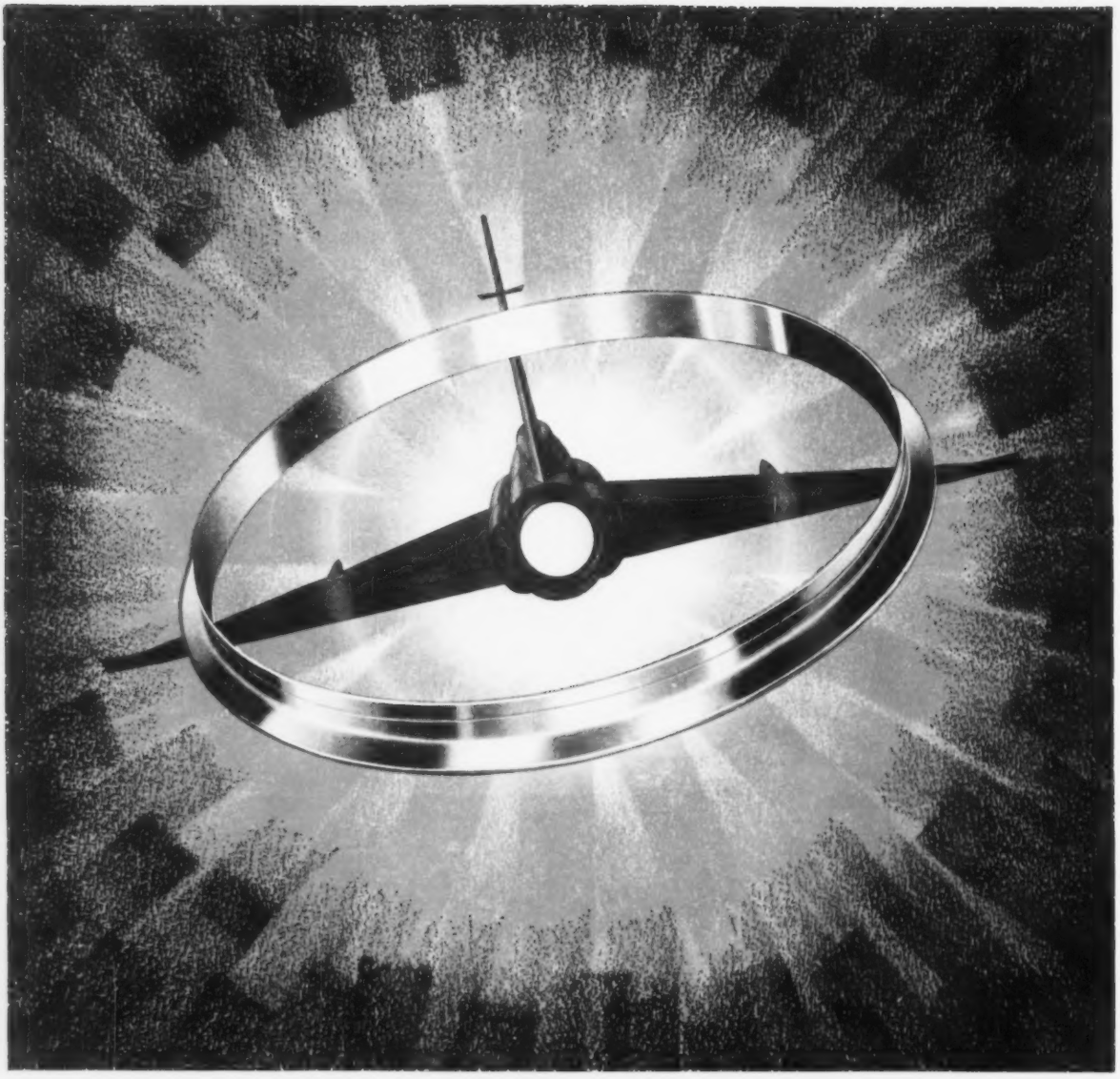
You hear much comment about Greenlees' uninterrupted, round-the-clock performance in widely different industries. With good reason, too, for Greenlee offers years of manufacturing experience... plus manufacturing integrity not often duplicated.

Want complete information? Call in the Greenlee man. Let him give you the complete story. Please submit a print when inquiring about a specific job.

WRITE FOR CATALOG No. A-405

GREENLEE BROS. & CO.

1805 MASON AVENUE
ROCKFORD, ILLINOIS



Cool Performance In A Hot Engine

Major U. S. manufacturers of jet aircraft engines have learned to depend on American Welding rings and circular components of stainless steel, titanium or other special alloys to solve many of the problems created by the requirements of today's supersonic performance.

American Welding is equipped to form, weld, fabricate and machine rings and weldments from 6" to 96" in diameter.

Why not contact American Welding's Industrial Products Division to talk about rings and components where top performance is required.

THE AMERICAN WELDING & MANUFACTURING CO.
120 Dietz Road • Warren, Ohio

AMERICAN WELDING
The World's Leading Manufacturer of Welded Rings

FREE LITERATURE

This section starts on Page 124

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

Coil Cradle

A data sheet gives data on a coil cradle. This unit has a new electronic time relay with it. It automatically maintains any desired length of slack loop from which the machine can draw. (Benchmaster Mfg. Co.)

For free copy circle No. 21 on postcard

Pumps

Pumps for industrial primary water supply are covered in an 8-page brochure. (Layne & Bowler Pump Co.)

For free copy circle No. 22 on postcard

Aluminum Conversion

An aluminum conversion coating for immersion or spray-washing is described in a bulletin. The coat provides aluminum with a chrome-type chemical film or a coating of the surface conversion type. (Turco Products, Inc.)

For free copy circle No. 23 on postcard

Barrel Finishing

Precision barrel finishing is discussed in a folder. It tells about barrel finishing equipment and supplies. (Speed-D-Burr Corp.)

For free copy circle No. 24 on postcard

Steel Mill Valves

Valves for automation in steel mills appear in a 16-page bulletin. It covers: supply water from source to mill; emergency city connection; valves for liquid level control; emergency fire protection; spray valves for hot strip mills; coke quenching and drain valves; preventing flywheel explosion, etc. (Golden-Anderson Valve Specialty Co.)

For free copy circle No. 25 on postcard

Speed Reducers

Double-enveloping worm gearing used in Cone-Drive speed reducers can provide more load-carrying capacity, size for size, than possible with other right-angle reducers. So states a 24-page bulletin on the reducers. (Michigan Tool Co.)

For free copy circle No. 26 on postcard

Eye Accidents

How to prevent industrial eye accident casualties is told in a 4-page brochure. It describes eye-wash fountains and drench showers. (Haws Drinking Faucet Co.)

For free copy circle No. 27 on postcard

Film Lubricant

A bulletin describes a high temperature solid film lubricant for operating temperatures up to 1000°F. (Electrofilm, Inc.)

For free copy circle No. 28 on postcard

Valves

Valves for air or oil, with hydraulic service to 200 psi are described in a folder. Another covers clamp type air cylinders. Still a third publication covers a line of cylinders for air, water or hydraulic operation at pressures to 200-psi. (Modernair Corp.)

For free copy circle No. 29 on postcard

Wire Rope Fittings

Heavy-duty wire rope fittings and accessories are the subjects of a 4-page brochure. (Farrell-Cheek Steel Co.)

For free copy circle No. 30 on postcard

Balancing Units

Precision balancing machines are covered by an 8-page bulletin. (Taylor Dynamometer and Machine Co.)

For free copy circle No. 31 on postcard

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. 5/16/57

Circle numbers for Free Technical Literature or information on New Equipment

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70

If you want more details on products advertised in this issue fill in below:

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Page ..... Product .....

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Your Name .....

Title .....

Company .....

Co. Address .....

City ..... Zone .....

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FIRST CLASS
PERMIT No. 36
(Sec. 349 P.L.&R.)
New York, N. Y.

BUSINESS REPLY CARD
No postage necessary if mailed in the United States

POSTAGE WILL BE PAID BY

THE IRON AGE
Post Office Box 77
Village Station
NEW YORK 14, N. Y.

BUSINESS REPLY CARD

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Circle numbers for Free Technical Literature or information on New Equipment

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Your Name .....

Title .....

Company .....

Co. Address .....

City ..... Zone .....

State .....

FREE LITERATURE

Anti-friction Bearings

Anti-friction bearings for special applications are listed in a 32-page catalog. (Industrial Tectonics, Inc.)

For free copy circle No. 32 on postcard

Gas Equipment

Industrial gas manifolds with automatic controls are described in a new 24-page catalog. (Linde Co., div. of Union Carbide Corp.)

For free copy circle No. 33 on postcard

Induction Heating

Motor-generator sets and accessories for induction heating are covered in a bulletin. (Westinghouse Electric Corp.)

For free copy circle No. 34 on postcard

Adhesives

Adhesives, protective coatings and sealers are described in a four-page folder. (Raybestos-Manhattan, Inc.)

For free copy circle No. 35 on postcard

Presses

Adjustable bed presses for secondary operations between automated presses in the production line are presented in a bulletin. (Niagara Machine & Tool Works.)

For free copy circle No. 36 on postcard

Copperply Wire

Specifications of Copperply wire are described in a new 8-page booklet. (National-Standard Co.)

For free copy circle No. 37 on postcard

Gravity Hammer

A bulletin describes a piston-lift gravity drop hammer. (Erie Foundry Co.)

For free copy circle No. 38 on postcard

Lighted Switch

A new turn-to-lock-down lighted pushbutton switch is covered in a data sheet. (Micro-Switch Div., Minneapolis - Honeywell Regulator Co.)

For free copy circle No. 39 on postcard

Panelescent Lamps

Panelescent lamps are discussed in a brochure. It covers the lamps' construction and characteristics. (Sylvania Electric Products, Inc.)

For free copy circle No. 40 on postcard

Circuit Breakers

How particular type circuit breakers use stored energy is told in a folder. It describes breakers rated 150-mva or higher. (General Electric Co.)

For free copy circle No. 41 on postcard

Gearing

Industrial gearing is discussed in a new booklet. (Westinghouse Electric Corp.)

For free copy circle No. 42 on postcard

Melters

Gas-fired melting and furnace equipment appears in a firm's catalog. (American Gas Furnace Co.)

For free copy circle No. 43 on postcard

Penetrant Tests

A new manual contains information on fluorescent penetrant materials and fluorescent penetrant testing. (Magnaflux Corp.)

For free copy circle No. 44 on postcard

Welding

Hydraulic controls for use with flash-butt welding machines on a wide variety of flash welder applications are shown in a bulletin. (The Taylor-Winfield Corp.)

For free copy circle No. 45 on postcard

Thread Tools

"Let's talk about thread tools," says a 24-page publication. It offers data on revolving tangent die heads, stationary tangent die heads, taper receding die heads, ground thread chasers for tangent dies, etc. (Jones & Lamson Machine Co.)

For free copy circle No. 46 on postcard

Pick exactly the right steel for any job from J & L's complete cold finished line

steel whorl production increased 22% with J & L LEADED STEEL

Superior uniformity and machinability of J & L 1113 Leaded Steel enabled this manufacturer to increase production from 110 to 140 pieces per hour. J & L Leaded Steels give you higher cutting speeds, longer tool life, improved finishes. Call your local distributor or write to Jones & Laughlin, 3 Gateway Center, Pittsburgh 30, Pennsylvania.

J&L STEEL

Jones & Laughlin

. . . a great name in steel

MACHINING PERFECTION always starts with the right steel

A little GOLD in our hair

P. W. Christensen

PRESIDENT, THE CINCINNATI GEAR CO.

We're older than we look. In fact, our firm is 50 years old this year, and while we haven't *actually* taken to tinting our hair gold, we *are* doing our best to let everyone know about this, our golden anniversary. Because we think it's something of an accomplishment — 50 years of uninterrupted progress and growth and leadership in gear-making that have made our reputation "good as gold." That reputation has been as much the result of adhering to some old-fashioned ideas about craftsmanship, service and attention to details as it has been the result of aggressive pursuit of the latest technological advancements in gear manufacture. It's a reputation we've worked hard to earn in the 50 years past, and one we'll work equally hard to perpetuate in years to come . . . a reputation for producing the best in custom "gears . . . *good gears only.*".

THE CINCINNATI GEAR CO.
CINCINNATI 27, OHIO
Fifty Years of "Gears—Good Gears Only"

CINTI®

Shop Intercom Setup Cuts Travel Time

Every minute a production man spends processing a work-change report wastes money. So, too, is time used to reach the timekeeper.

To keep workers at machines instead of in-line at timekeeper's desks reporting must be speeded, simplified.

An intercom setup does this.

▪ When a production worker walks into a large metalworking plant in Detroit, he leans over a call box at his work station and reports his presence, clock, job as well as operation number. This information "flashes" into a central office. It is immediately key-punched into a tabulating card. Later, when the worker finishes his first job, he again visits the call box and reports what he has accomplished. He also includes details of the new job he is about to tackle. Workers repeat this procedure every time a work change occurs during the day.

At the end of his shift, the central office automatically balances out his work for the day against his actual clock hours.

Paying Off—Installed almost a year ago at General Electric Co.'s Metallurgical Products Dept., to cover the several buildings of the firm's plant, the system is well on its way to a pay-off.

According to a company spokesman, the automatic setup already has paid itself off three times over, making an annual saving of about $36,000. It immediately released 11 badly-needed workers for other duties, and picked up additional man-hours by eliminating "travel and waiting time" required under the old timekeeping method.

Saves Floor Space—The system saves about 1000 sq ft of floor space. It also fights job boredom by creating an interesting and diversified job for the timekeepers in charge of the central office.

Most important, the timekeeping arrangement provides a fast flow of accumulated information to the organization's accounting departments and management. For example, it spots machine downtime, and detects unrealistic production piece counts. It also can be used to ascertain the "job status" of work-in-

Scenes like this spell out wasted time and money.

Want More Data?

You may secure additional information on any item briefed in this section by using the reply card on page 129. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

process, to cost work-in-process inventories, and to record daily all completed jobs.

More Efficient—The new setup is a radical departure from the old method which required the services of 18 timekeepers. Timekeepers were formerly "sprinkled" throughout the plant in various departments. Their jobs called for recording date, clock, number of the employee, job number, operation number, work produced, and figuring elapsed time on each production voucher. The vouchers, in turn, were "balanced out" daily with the employee's actual clock card hours.

The procedure also required the worker to check "in and out" with his timekeeper five or more times during his working day. In reporting a work change, the employee also lost some productive time. The extent of this time depended on the distance, the route and detours needed to reach the timekeeper.

The Line-up—Upon reaching his destination, the worker often would find the timekeeper already occupied. Then he'd have to wait patiently in line for service. The timekeeper, himself, because of the spasmodic nature of the reporting, due to varying production-completion schedules, frequently found himself with nothing to do.

The new two-way communications, or audio-timekeeping system changed all this. It is fast and automatic in tabulating and accumulating information.

Each call station is a contact with the central office, and no more than 60 ft from any production worker. To date 28 call boxes are strategically located within the plant, according to the number of employees, and volume of job changes concentrated in the work areas.

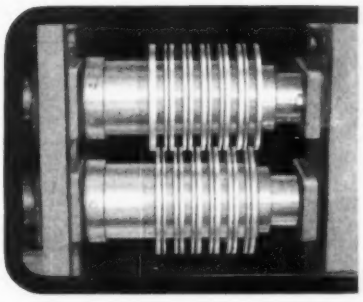
Brain Center — In the central office, three master "send and receive" sets make it possible for any call originating in the plant to be simultaneously registered on the master control boards.

All the variable data is gathered on keypunched tabulating cards. These are integrated with a master

CUT COSTS 3 WAYS!

WITH

COWLES
SLITTING KNIVES



Cowles knives are so accurate they can be assembled on an arbor quickly with little or no shimming, reducing set-up time. They stay on the job longer, require very infrequent interruption for re-grinding;— and — produce straight edged strip with minimum burr, preventing tie-ups in later forming operations.

For maximum satisfaction, specify Cowles, world's largest manufacturer of rotary slitting knives. Furnished in any face, diameter and bore, in our **Max-Cut; Special Alloy; Super Alloy; Circle C; Super C;** or any special analysis for slitting high and low carbon steels, stainless, silicon or non-ferrous metals. Prompt delivery!

Engineering Assistance On Any Slitting Job.

COWLES TOOL COMPANY

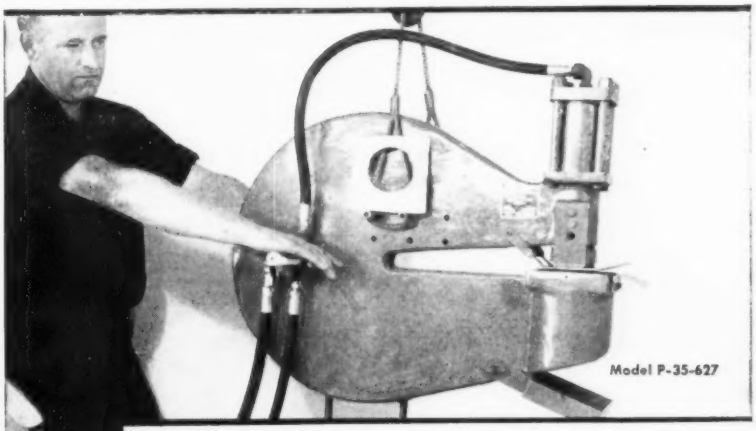
2060 WEST 110th STREET • CLEVELAND 2, OHIO

Specializing in the Manufacture of

ROTARY SLITTING KNIVES • SPACING COLLARS • ROTARY TRIMMING KNIVES • ROLL TURNING TOOLS • EDGING ROLLS • CUT-OFF KNIVES STANDARD AND SPECIALLY ENGINEERED TOOLS FOR ALL FERROUS AND NON-FERROUS PROCESSING, TRIMMING AND FORMING REQUIREMENTS.

Take **Metallurgical Test Slugs**

THIS FAST, EASY WAY



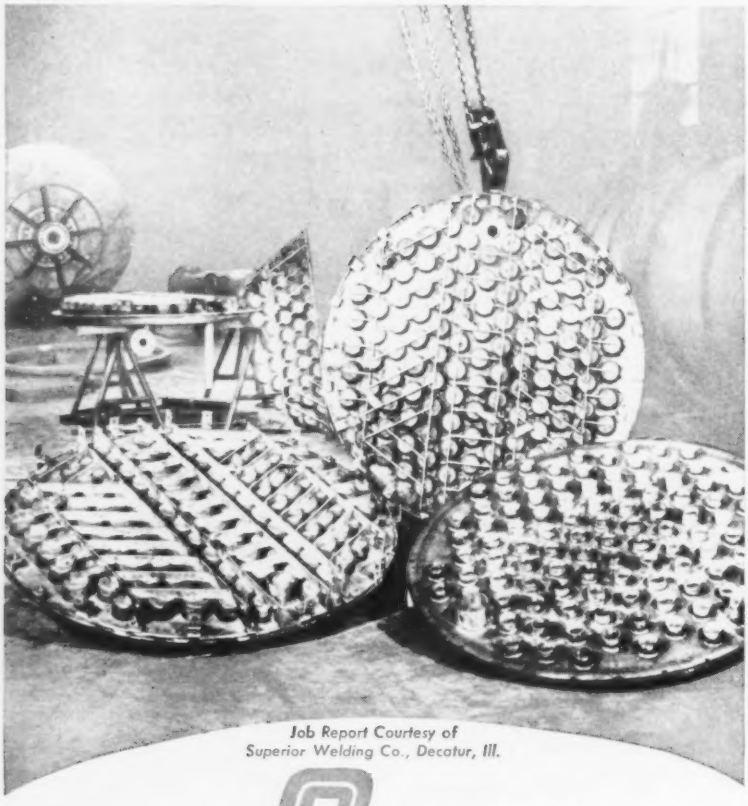
Only 5 seconds "STOP TIME" with MANCO

PORTABLE HYDRAULIC PUNCH

Punches 3½" burr-free sample from ¼ gauge steel. Ideal for ductility and Rockwell tests. 15" reach. Powered by 5 hp. electric motor, the Manco hydraulic "Hi-Thrust" pump delivers 35 tons thrust. Unit can be suspended by spring tension balancer or roller mounted to move along track adjacent to cold reduction mill. Other models also available.

Write for information
Dept. IA 5-C
MANCO MFG. CO., Bradley, Illinois

When the *quality* of welded equipment is essential to performance



Job Report Courtesy of
Superior Welding Co., Decatur, Ill.

WELD WITH ARCOS

STAINLESS ELECTRODES

Welded bubble cap trays, such as these, are used to refine petroleum, petro-chemicals, and food products. They—and the welds—are subjected to corrosion from the liquids and gases passing over them. High processing temperatures intensify the corrosive conditions. ARCOS Chromend KMo Electrodes (Type 316 with 2.5% molybdenum) were used because of their ability to resist acid conditions combined with heat. These electrodes—like all Arcos stainless filler metals—produce welds that are trouble-free both during welding and in service.
ARCOS CORPORATION, 1500 S. 50th St., Philadelphia 43, Pa.

tabulating card. The latter contains prepunched rates and job information. In effect, it presents a "whole package" to the machine accounting unit.

Vapor-plates Aluminum To Magnesium

Vapor-plating appears to be a feasible method of coating magnesium with corrosion-resistant aluminum. So reports an Air Force-sponsored research team.

Recent work with high-purity aluminum shows it's very promising as a protective coating for magnesium which has been restricted in some applications by lack of suitable protection against corrosion. Until now, however, no satisfactory method existed for applying the coatings.

Looks Good—The feasibility of the vapor-plating technique is based on a study of aluminum compounds sufficiently unstable to decompose to yield aluminum metal at suitable plating temperatures. Most promising for further experimentation is pyrolysis of aluminum alkyls and of aluminum hydride and its derivatives at low pressures and at temperatures of 400 to 500°C.

A report by the team, PB 121-860, is available from the office of Technical Services, U. S. Dept. of Commerce, Washington 25. It contains 28 pages, costs 75 cents.

Handles Packages

Especially designed for steep-angle operations in plants and warehouses, a new ribbed package conveyor belt carries lightweight packages as firmly as it carries heavy cartons. Both are held firmly in place by a series of inverted V-shaped ribs. These grip the items in either incline or decline operations.

Extra protection for holding extremely lightweight packages in place is provided by raised ribs or

cleats (also inverted V-shaped) spaced 18-in. apart. The standard ribs are ¼-in. high and are spaced four to the inch. The raised ribs,

Conveyor's raised rib holds very light items in place.

which also help move packages onto the belt, are ⅜-in. high.

Molder Rubber — Ribs are molded with tough, long-wearing rubber compounded so flexible the ribs spring back to their original upright position when bent by heavy packages. The carcass is a special lightweight fabric.

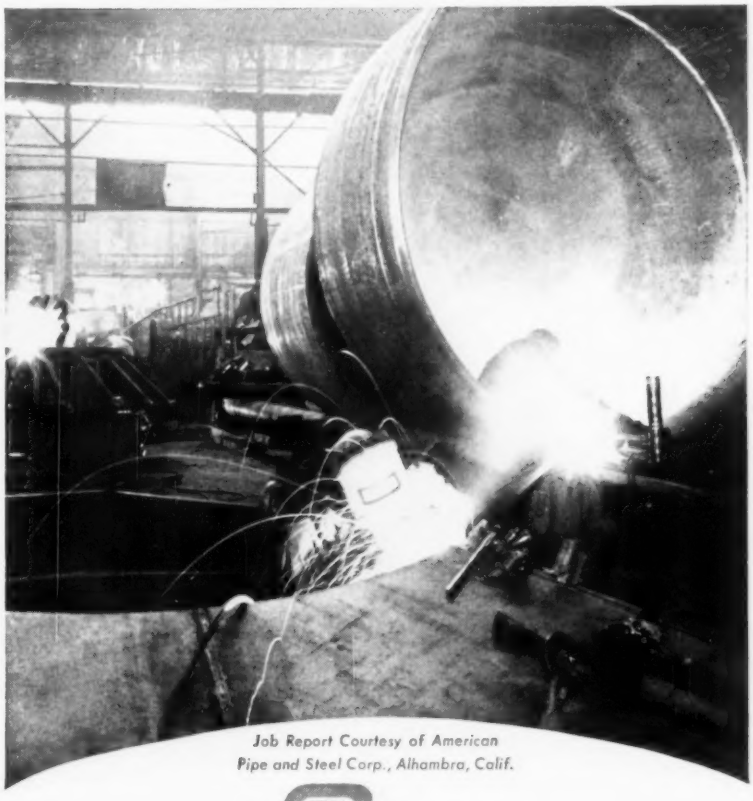
Flame Cutter Works Long Steel Plate

Carving steel with an oxyacetylene flame reaching 6000°F, a 124-ft shape-cutting machine separates parts that are welded into large overhead ladle cranes.

Installed by National Cylinder Gas Co. in the Alliance (Ohio) plant of Morgan Engineering Co., the unit adds "production line automation" to the industrial art of oxyacetylene cutting of heavy steel. It mounts three large shape-cutting carriages on a continuous steel tracing table 124-ft long.

It's Flexible—Production flexibility, though, rather than total length of cut, is the unit's most important feature. With it, idle time spent waiting for overhead cranes to move away one piece of work and set up another to be cut is considerably reduced. The unprecedented amount of working

When heavy chrome-moly welds must pass X-Ray Inspection

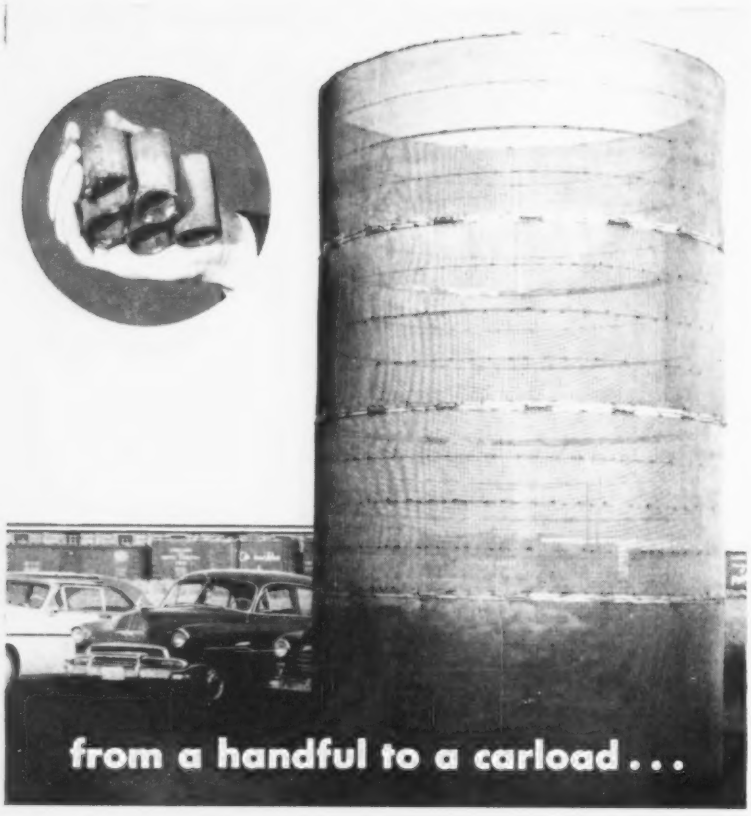


Job Report Courtesy of American Pipe and Steel Corp., Alhambra, Calif.

WELD WITH ARCOS

CHROME-MOLY ELECTRODES

In setting up this job—fabricating heavy alloy components of lead melting pots—new welding procedures were required to assure that all welds would pass x-ray inspection. With the help of Arcos Technical Service, both manual and submerged arc procedures were established and ARCOS Electrodes and Rods were used exclusively. The quality of Arcos weld metal consistently assures internally sound, flaw-free welds. And Arcos Technical Assistance prevented problems on what could have been a "tricky" job. ARCOS CORPORATION, 1500 S. 50th St., Philadelphia 43, Pa.



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space lets the cranes set up a job in one area while the cutting machine carriages are at work in adjacent sections of the table.

Without this production-line arrangement, normal industrial "down time" may run as high as 50-pct, says its installers.

Copy From Pattern—Four electrically-controlled oxyacetylene cutting torches mount on each of two of the cutting unit carriages; six torches are on the third. This means a total of 14 torches can operate at one time. With operators working from remote control panels, the cutting machine carriages range from one end of the table to the other. They cut heavy steel into intricate shapes copied from a pattern which is laid on the continuous-length tracing table. As many as six identical shapes can be cut at one time.

One of the big jobs the continuous battery of cutting machines works is cutting parts from more than 920 tons of steel that go into each of three 500-ton capacity ladle cranes being manufactured. A bearing block with a 26-in. thickness is torch cut. Ladle hooks weighing 17 tons each and more than 17-ft long are made by laminating 13 steel plates into a stack 12½-in. thick and cutting the entrie stack in the shape of a question mark in one operation.

No Solar-heat Problem

Researchers seeking better materials often run into stumbling blocks. This is true even when using the sun as an instrument in the search for high temperature materials.

Engineers at General Electric Co.'s Missile & Ordnance Systems Dept., Philadelphia, use a solar furnace in their work. The unit concentrates radiant energy much like a magnifying glass, pinpointing the sun's rays.

View Specimen—After the rays work on the specimen, the researchers view it through optical purometers to determine surface temperatures. These go up to 4000°C. Using this setup, the scientists study material reaction at high temperatures in an oxidizing

Searchlight steps up heat as researcher views furnace test.

atmosphere. They hope that this will result in developing materials for high temperature uses (i. e: supersonic aricraft, missiles).

But what happens on cloudy days? Does the search halt? No, they've solved that problem, too. On cloudy days, a searchlight gets turned on, stimulating the sun's rays.

Iron Ores Symposium

A second symposium on benefication of iron ores, sponsored by the French Steel Research Institute (I.R.S.I.D.), is scheduled to be held in Paris from May 21 to 23. Further details of the meetings can be obtained from Dr. Etienne Spire, 3877 Draper Ave., Montreal, Canada.

Plant Goes To Visitors

Most plant managers don't mind visitors treking through the layout. If you prefer, though, new you can take your plant to the visitors. Here's how: get a television setup. The Peerless Foundry Co. Cincinnati, shows its gray iron foundry to viewers via the medium of closed-circuit TV. Its first such telecast was viewed at the First Engineered Castings Show held recently in Cincinnati. The equipment is highly mobile.

Being a closed-circuit system, it needs no special government permit for operation. The picture transmits over a cable to the receiver.

Setup Solves Classic Handling Problem

Smooth materials handling results from a unique setup. It takes the worry out of track crossovers at towline-trailer freight stations.

The system, in use at Santa Fe's Corwith Freight Yards, Chicago, employs a slotted manganese steel track section and rubber inserts. Engineers at Mercury Mfg. Co., the trailer system producers, believe

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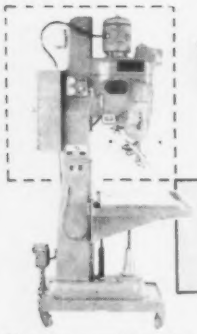

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NON-FLUID OIL is not the name of a general class of lubricants, but is a specific product of our manufacture.

the idea, at a classic trouble spot, will permit more freedom in the layout of towline-trailer systems.

Crosses Tracks — This underfloor towline for trailers was designed to cross tracks; these are flush with the terminal work level in this case. Ordinary steel sections wouldn't stand up under the wear and tear of heavy railway rolling stock. However, by casting this

Rubber inserts at this track crossover keep traffic moving.

track section of manganese steel, the railroad gave the part the necessary strength and durability.

Special rubber inserts set against the side of the track at the point of trailer-wheel crossing. They allow the wheel flanges of freight cars to pass slowly, by simply deforming the rubber. When the rubber inserts spring back they provide sufficient support for smooth, level transit of the trailers over them.

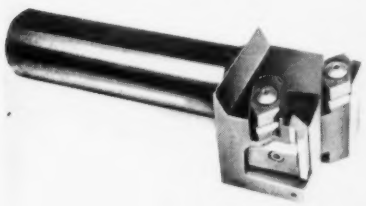
Reground Cutters Stay

Throwaway inserts apparently aren't going to completely replace tools requiring grinding. At least one large cutting-tool maker frankly admits this.

The firm, Wesson Co. of Detroit, recommends employing both for some applications. It encourages use of the slug type (on-end) inserts and throw-away types in the same tool holder for operations where

grooving is combined with turning, chamfering or the like.

Types Team-up—A typical new tool holder made by the company employs both types of inserts. Two



This tool holder combines throw-aways with slug inserts.

of them are square throw-aways and are used for chamfering a transmission gear in two places. The other insert is used for cutting a groove in the same gear. It is of the slug type.

Here's why they use both: Wear is greater on grooving than chamfering tools. Slug type inserts can be quickly reground. Special throw-away inserts for this use could not be indexed and would be costly.

Alloy on Tool Tip Boosts Its Life

Bending tools for vacuum tube filament production last longer with the right tip. That's the conclusion of one manufacturer. The firm now tips its tools with an iron-base chromium-tungsten-boron alloy in place of a previous material.

Since adopting the alloy, Nihon Radio Co. of Tokyo, Japan, has tripled the useful service life of the bending components.

Needs Replacement — The tool is similar in appearance to a small lathe cutter. It bends a fine, yet very stable wire used as the filament in vacuum tubes. The wear encountered is much like that found in a drawing die. Tools tipped with the former material needed tool replacement every 10 days.

In an effort to improve service

STAY OUT OF TROUBLE WITH A FORGING!

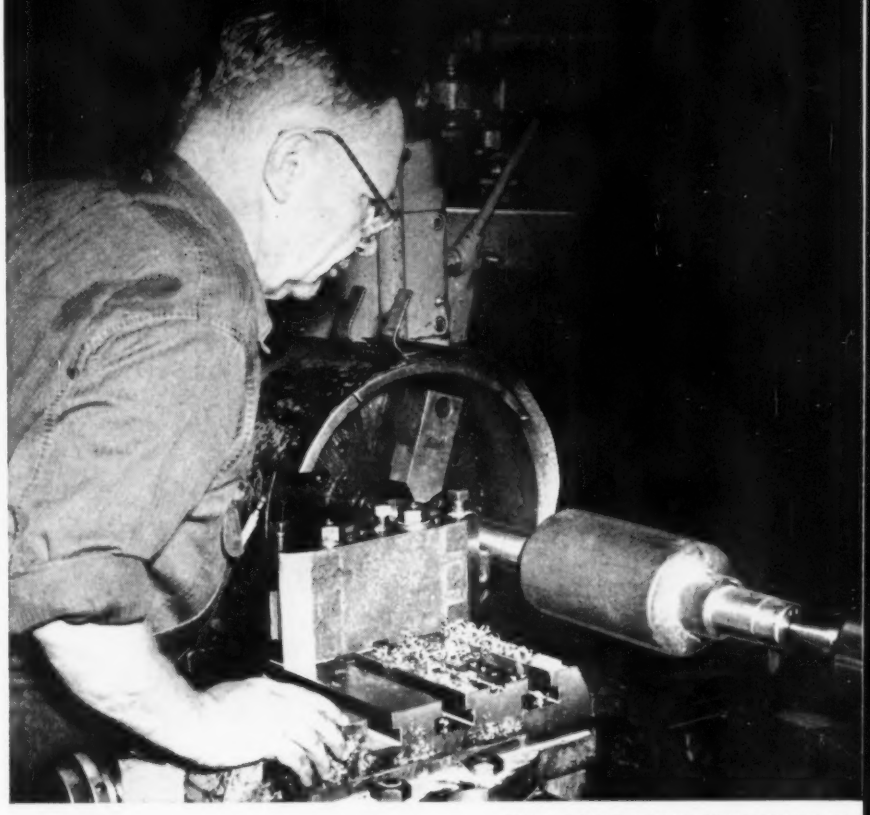


PHOTO - COURTESY CLEVELAND WORM AND GEAR CO.

The part illustrated above *will* become a component of the completed product — will *not* become a reject — BECAUSE IT IS A FORGING.

You get effective machinability because forgings are dense, homogenous metal, free of porosity and other flaws. Forgings start with *forging quality metal* which is improved by the forging process. This fact also offers advantages in heat treating and welding.

If you are experiencing a costly reject rate, find out how *forgings will help you.* Call in a forging engineer, and also send for the booklets offered below to learn the economies that can be gained by the use of forgings in your product.

Reduce your cost by using forgings. Send for booklets, ☐ "What is a Forging?" and ☐ "Management Guide to the Use of Forgings."

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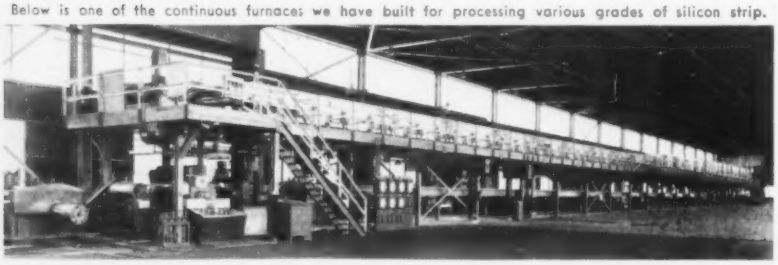
18 for galvanizing and aluminizing steel strip
25 for processing silicon steel strip
12 for bright annealing stainless steel strip
9 for miscellaneous operations on high and low carbon strip
6 for special strip processes—not publicized
7 more are now in process of engineering and building

Considerable enginering experience, ability and "know how" were important factors in designing, building, and installing this equipment—for some of the world's leading strip producers and processors.

We have the engineers, the research, the experimental and the complete manufacturing and erection facilities to handle your ferrous or non ferrous strip, wire, tubing or any other heat processing problems.

* Approximately 90% of above equipment was completed since 1945.

Below is one of the continuous furnaces we have built for processing various grades of silicon strip.



EF

BULLETIN No. 461
shows typical installations of EF Gas-fired, Oil-fired and Electric Furnaces.
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life, tool engineers at the company tried applying a ⅛-in. thick coating of alloy welding rod to the tool's tip. It's proven successful; the tool now lasts 30 days before requiring replacement.

Hexagonal Boxes Ease Handling Problems

V-8 service crankcase assemblies for International trucks are "wrapped" for shipment in "form-fitting" hexagonal wirebound boxes at the Indianapolis Works of International Harvester Co. This simplifies handling and storage problems both for that company and its customers.

Workers "wrap-up" a unit in a hexagonal wirebound box.

The unique pack permits four packed hexagonal boxes to be "nested" on a 42 x 42-in. pallet. This offers a broad and stable base for high-stacking loaded pallets. Were more conventional rectangular boxes used, only two could be placed on a pallet. This wouldn't allow safe high-stacking.

Cuts Handling — Thus, efficient use is made of warehouse cube. At the same time, the firm reduces its handling.

V-8 service crankcase assemblies weigh up to more than 400 lb, de-

pending upon the model and equipment. A wirebound hexagonal box weighs only 44 lb with consequent freight savings.

Intricate Steel Pipe Setup Fights Fires

Fire protection of a large automotive body plant in Indiana required installation of 40 miles of steel pipe. This pipe feeds 17,000 sprinkler heads which are distributed over a floor area of 1,700,000 sq ft.

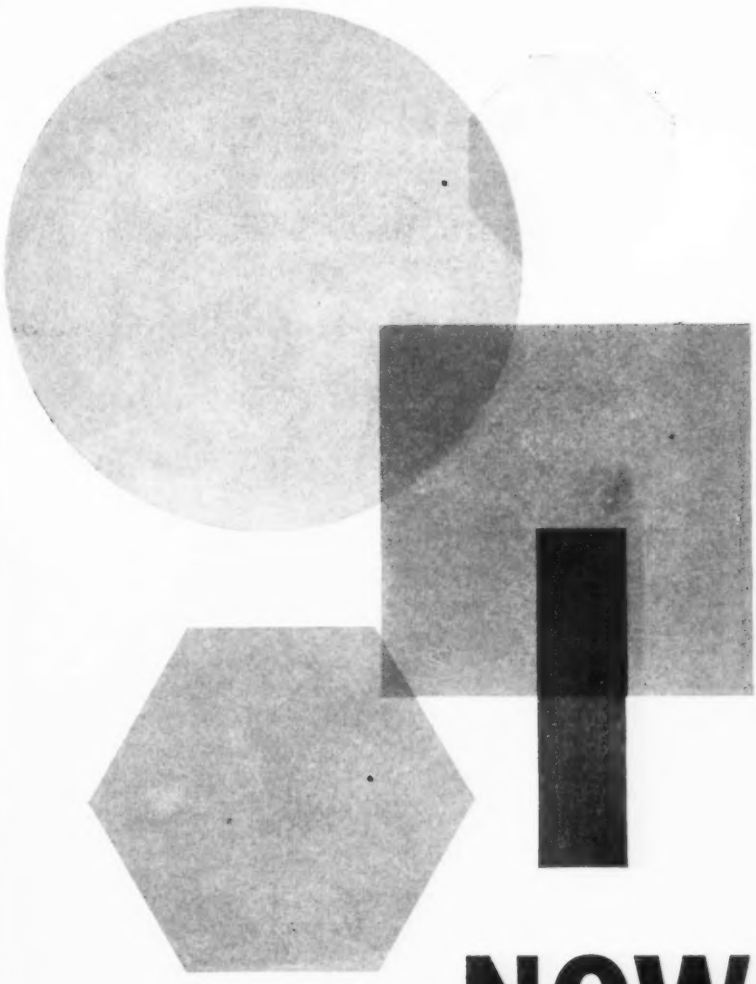
Uniform water distribution in this network called for careful engineering to allow for friction losses in the water flow. This assures an even flow at every sprinkler head regardless of location and volume of demand.

Many Zones — According to Daniel J. Keating Co., Philadelphia, installers divided the system into 43 separate, interlocking

Here, 6-in. pipe goes into a coupling on an 8-in. line.

sprinkler zones. These connect into two miles of 10-in. mains which encircle the plant. Each branching system uses a series of pipe sizes that supply the right volume to all sprinkler heads when they are open.

Although the system isn't intended to put out fires, it can extinguish most blazes. Each sprinkler head delivers up to 50 gpm in overlapping areas of 130 sq ft.



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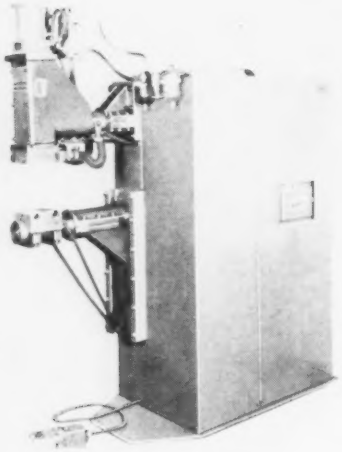
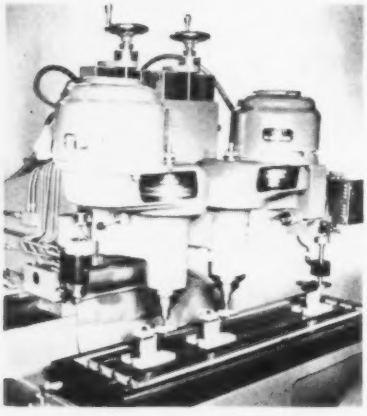


Spot, Projection Welder Saves on Floor Space

This roller head press type combination spot and projection welder makes good use of floor space. Standard models have their arms off center with the controls installed next to the arms and within the welded chassis frame where they are protected. Arms can be installed left or right of centers as specified. This makes possible convenient welding of large irregular-shaped pieces. These fit naturally around the corner of the machine. Its biggest asset is this: a unit with right-hand mounted arms can be installed immediately adjacent to one with left-hand mounted arms to bring the points within 9½-in. for sequence welding operations. Also, the user can extend the arms by simply loosening three screws on each arm casting to give up to 30-in. throat depth. The welders are water-cooled with open or closed circuits; they are cool operating, according to the maker. (Allied Welder Corp.)

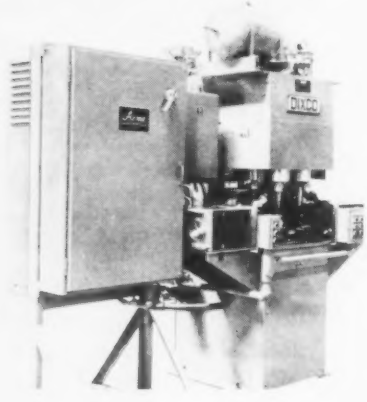
For more data circle No. 47 on postcard, p. 129



Tracer Performs Intricate Contouring Work

Fully automatic, this 2-spindle tracer controlled router performs internal and external contouring. Equipped with a hydro-magnetic tracer control and two spindles, the machine produces a closed 360° contour automatically through its rotating, magnitized stylus. This clings to the template. Thus, little operator attention is needed. Each spindle has a separate 2-hp motor and each is completely adjustable through lead screws to facilitate repositioning of the vertical height when the operator changes cutters. The vertical slide is hydraulically actuated and controlled by a servo valve on the left side of the machine. The unit provides four turret stop positions for contouring at various depths. A three-dimensional tracer control can be added to give a combination of profiling and contouring. (Turchan Follower Machine Co.)

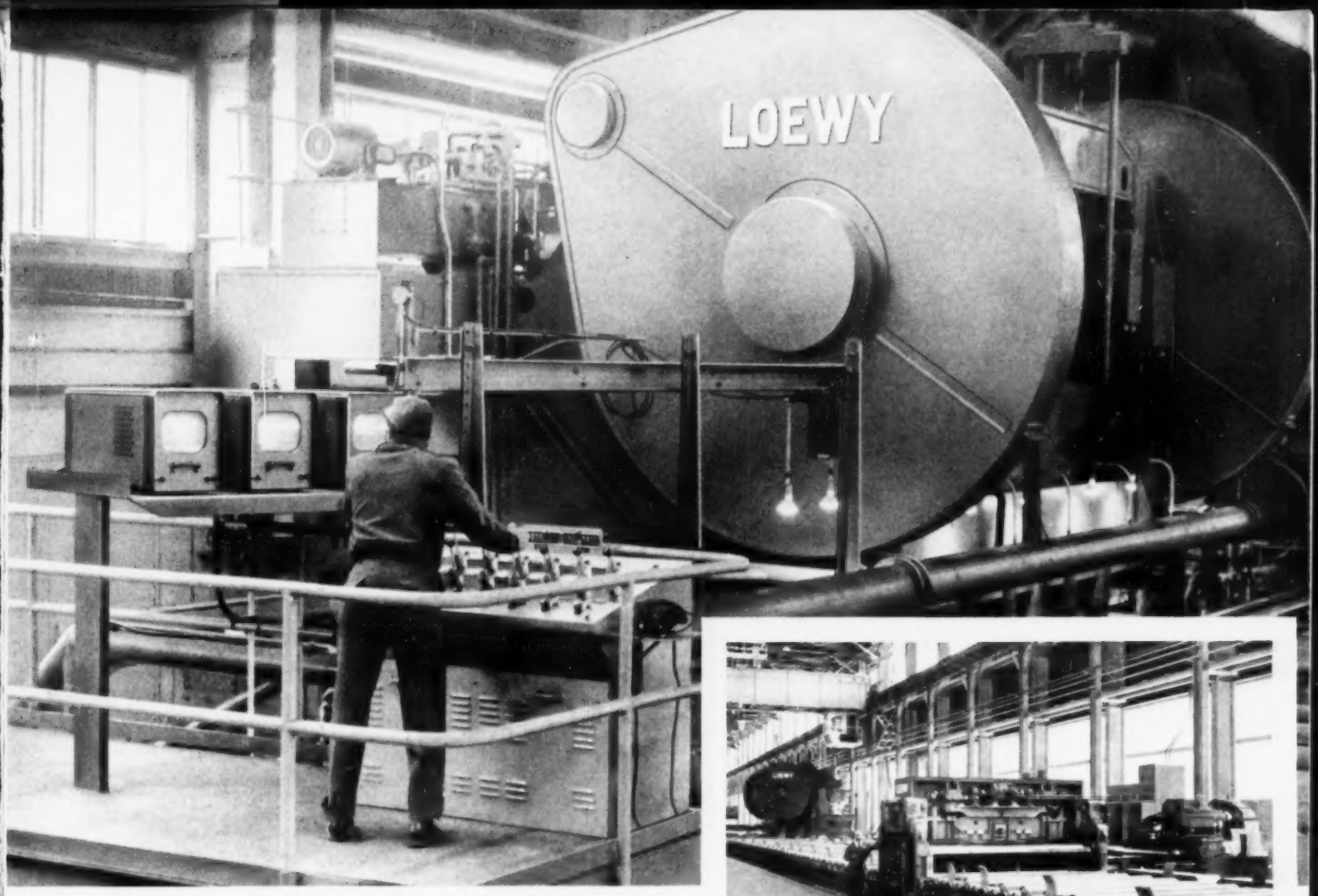
For more data circle No. 48 on postcard, p. 129



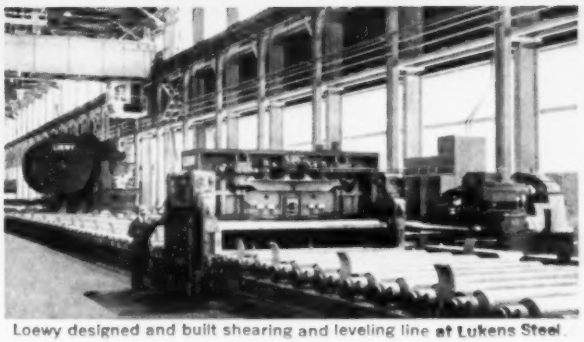
Machine Turns Out 180 Welded Parts Per Hour

This automated four-stud projection welder works automatic transmission components for an automaker. Custom-made, it welds studs to automatic transmission converter covers. The welder keeps close tolerances. It also features an automatic unloading and part turnover device which feeds the complete welded part to the inspection station, prior to machining. Operation of the machine is automatic following manual loading of four studs in the lower electrode and placing the stamping in the holding fixture. Its rated output is 180 welded parts per hour at 80-pct efficiency. The machine is only 24 sq ft (4 x 6 ft) and is 8-ft high. The welder rates at 260-kva, employing four 65-kva resistance welding transformers, at 440-primary input. (Dix Engineering Co.)

For more data circle No. 49 on postcard, p. 129



Loewy-Hydropress alloy steel plate shear with completely mechanized, one-man-operated plate manipulator at the Lukens Steel heat treating plant, Coatesville, Pa.



Loewy designed and built shearing and leveling line at Lukens Steel.

At Lukens Steel . . . one-man-controlled alloy steel plate heat treating and shearing installation

The 800-ton-capacity alloy steel plate shear shown above is part of a complete Loewy-Hydropress shearing-leveling and mechanized plate-handling installation at Lukens Steel's Coatesville plant, considered the most modern alloy steel plate heat treating facility in the United States.

By means of a specially developed plate manipulator —a truly mechanized handling system—the need for manual plate handling has been eliminated. One shear performs all cutting operations in succession. It is capable of cutting up to 1¼-in.-thick alloy steel plate. All movements for cutting four sides of the plate are remote-controlled by one operator who moves it into the shear, lines it up with the aid of a TV circuit, and then accurately cuts it to size.

This Loewy-Hydropress installation is another outstanding example of the advanced auxiliary equipment so vital to a really integrated mill operation.

Loewy-Hydropress, builder of all types of rolling mills, also designs and builds roller-straighteners, levelers, manipulators, individually driven motor rollers, ingot pushers and tilters, transfer tables, mechanical cooling beds, and other auxiliary equipment to the customer's individual requirements. The vast, integrated facilities of Baldwin-Lima-Hamilton enable Loewy to speed the delivery of this equipment.

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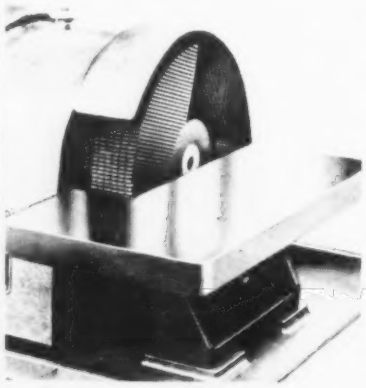
Filing Machine

Continuous filing can now be done four to six times faster than by hand. This, too, without having to rely on skilled labor or costly



milling and grinding set-ups. Doing the work is a filing machine that trims, deburrs and files a wide variety of small components such as moldings, pressings, castings, metal patterns, laminations, welded joints, etc. The filing machine uses disks and rings which cut without heat, abrasive or coolant. They also retain their shape without redressing. A small table, 12¼ x 4½ in., which can be locked at several angles to the disk, makes holding and feeding objects to the disk or ring easier for faster operation. Material removed, unlike that from some finishing machines contains no abrasive or foreign matter, and may be reclaimed. In the case of precious metals, the filing process facilitates the production of small particles or dust which are collected in the tray. (Newage Industries, Inc.)

For more data circle No. 50 on postcard, p. 129

Wire Coater

A dual hot dip machine speeds-up the coating of wire cloth with lead or zinc. Key to the unit's increased productivity is an arrangement of one roller above the other. This permits wire cloth up to 60-in. wide to move through successive baths of sodium hydroxide and muriatic acid, two cold water rinses and a flux pan before passing through a tank of molten metal. After the coating solidifies, an accumulator winds it up in rolls preparatory to shipment. The dual unit coats approximately 1½-million sq ft of wire cloth per month. (Reynolds Wire Div., National-Standard Co.)

For more data circle No. 51 on postcard, p. 129

Milling Fixture

As many as eight pieces can be milled at one time with a new air-operated, hydraulic milling fixture, using split bushing-type collets that accommodate round, hex, square, or irregular shapes, the device features self-equalizing jaw inserts. These automatically compensate for variations in piece diameters. Thus, equal pressure is applied on each collet, providing solid lock-up on each part, regardless of its diameter. Diameters can vary ±0.010-in. in any size from 1-in. down to 1 16 in. (Multi Engineering Co.)

For more data circle No. 52 on postcard, p. 129

Perforations perplexing you?

If you have a design problem that's got you down maybe Hendrick can be of help. Sometimes the easiest and quickest way to enhance a product's beauty is to include a pleasing pattern of perforations in its design. Hendrick perforated metal not only helps increase a product's overall attractiveness, but also adds to its saleability as well. And whatever material you're using . . . whether it's metal, masonite, rubber, plastic, hard or insulated board for decorative display or fabricating purposes you can draw on Hendrick's long experience and perforating facilities to fill the bill. Write for details.

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Hendrick
MANUFACTURING COMPANY

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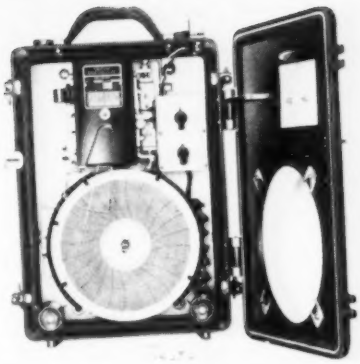
Perforated Metal • Perforated Metal Screens • Wedge-Slot and Wedge Wire Architectural Grilles • Mitco Open Steel Flooring • Shur-Site Treads • Armorgrids

Millivoltmeter Performs Survey Work

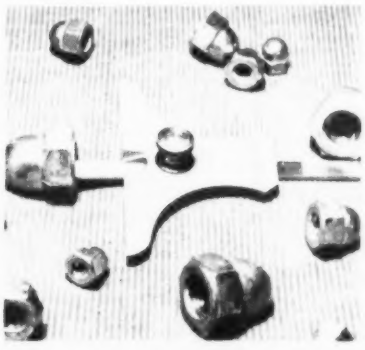


Self-contained, this portable millivoltmeter recorder for survey work incorporates a wide variety of ranges. Thus, it can be used to study practically any condition encountered in survey work which involves the measurement of voltage and current, such as in corrosion surveys. The low ranges are used chiefly for current, employing a standard shunt, or for measuring the millivolt drop on an underground pipe or cable, of known resistance. The millivoltmeter recorders are offered with movement sensitivities of either 2000 or 10,000 ohms per volt. Each instrument is equipped to measure over eight ranges, each of which is self-contained and available for use by turning a tap switch. It records on an 8-in. diam carbon-coated chart. (The Bristol Co.)

For more data circle No. 53 on postcard, p. 129

Cap Nuts

Die-cast zinc alloy "high series" cap nuts cover exposed bolt ends of varying lengths. These corrosion-resistant nuts provide up to



50-pct greater thread depth. This is due to an increase in the over-all cap nut height. They come in a complete range of hex sizes from 5/16 to 5/8 in. (Gries Reproducer Corp.)

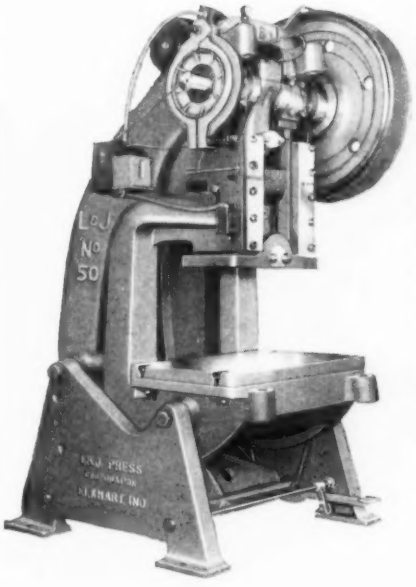
For more data circle No. 54 on postcard, p. 129

Conveyor

Where low-headroom is a problem, this vibrating conveyor handles metal scrap. It stands only 4½-in. high. Thus, is especially well suited for scrap-removal applications under metal-working machines, such as lathes, punch presses and milling machines. The trough vibrates on extremely low maintenance-free Neoprene springs. It can be arranged with drains for easy coolant collection and removal. (Carrier Conveyor Corp.)

For more data circle No. 55 on postcard, p. 129

L&J 50 SERIES



EXTRA CAPACITY WITH PRECISION TO MATCH

Large area dies are no problem when you have an L&J No. 50 Series press with its extra capacity. The exceptionally heavy frame provides maximum rigidity which enables the flanged, box-type ram to maintain precision alignment for precision jobs. The large work area will permit you to run a greater variety of work. Its dependability and tooling ease provide a new high in press efficiency.

Available in geared and non-geared models. Air clutch is available. It will pay you to get complete details now.

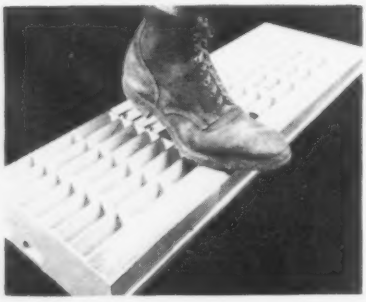
SPECIFICATIONS

Capacity: *Model 50*—50 tons, *Model 50B*—56 tons. **Shut Height:** 10" to 25". **Ram Stroke:** 3" to 8". **Ram Adjustment:** 3". **Ram Face:** 24" x 12". **Bolster Plate:** 36" x 24" x 2¼". **Throat Depth:** 12½". **Opening Thru Back:** 22". **Speed:** *Model 50* Non-geared—100 S.P.M., Geared—50 S.P.M. *Model 50B* Non-geared—95 S.P.M. Geared—46 S.P.M. *Higher speeds with air clutch.*

Write for Bulletin L-14

Describes L&J O.B.I. Presses. 23 Models, 14 to 90 tons, geared and non-geared. Also, 20 to 50 ton Double Crank, High Speed, Straight Side Presses.

L&J PRESS CORPORATION
1623 STERLING AVENUE, ELKHART, INDIANA



Aluminum Stair Tread Cuts Costs, Accidents

Safety and maintenance savings; what more could you ask of a plant stairway? This precision-cast aluminum stair tread combines those two qualities. Designed for use where stairs are subject to extreme weathering or corrosive atmospheres, the aluminum step uses a slip-proof abrasive nosing. It requires no costly protective coatings; a special alloy it's made from makes it strong and corrosion-resistant. Dirt won't even collect in its rounded, joint-free corners. Because the grating is one cast piece, concentrated loads are evenly distributed over all the bearing bars. Although designed to carry the weight of a heavy man, the stair withstands loads in excess of 3000 lb. Fused aluminum oxide abrasive, bonded to the stair plate, provides the non-slip tread surface. (Aluminum Corp. of America.)

For more data circle No. 56 on postcard, p. 129

ALTEN DRUMS

can't be beat!!

SPECIALISTS in Castings for

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• Manufacturers of Earth Moving Equipment

• Engineering and Construction Companies

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Good drums, carefully cast and machined, are a typical Alten product. Advance techniques employed by Alten result in features that really stand out in comparison tests and actual operation. If you want a quality cast and machined part, that really gives service, Alten just can't be beat.

Alten has the experience and ability to solve the unusual and complex problems that often go along with custom castings. You get extra qualities and pay no more. These include: greater strength and rigidity, abrasion, heat and corrosion resistance, closer tolerances, increased vibration dampening, more durability and many other advantages.

If you are using drums or similar parts, or if you have had difficulty obtaining specialized castings — ask Alten the next time. Our experience on this type work may offer you an improved product — at lower cost.

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Lancaster, Ohio

Forging Handlers

New all-hydraulic forging manipulators keep pace with a trend toward increased forging of high alloy steels and the new refractory-type alloys. The mobile manipulators come in capacities from 2000 to 20,000 lb. They use newly developed mechanical and hydraulic shock-absorbing features. These withstand the severe shock characteristics resulting from handling metals of minimum plasticity during forging. Available with diesel, gasoline, propane or plant power sources, the new unit has unlimited floor travel; all work handling motions are hydraulically actuated and controlled. (Salem-Brosius, Inc.)

For more data circle No. 57 on postcard, p. 129

Protective Tape Unit

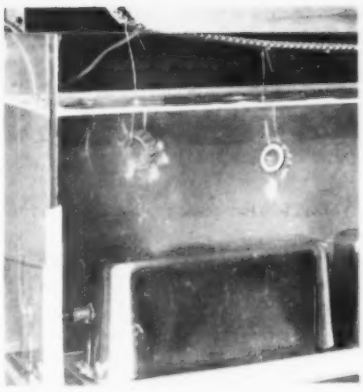
A new machine applies protective tapes to metal. With it, one man can apply tape to metal sheets as large as 5 ft wide and 20 ft long. The metal sheet lies in the bed while applicating rollers travel across the sheet. This applies the tape evenly and at the correct pressure. Tape can cover the entire sheet, strips, or intermittently. Several different types of tape may be applied at the same time. (Federal Hardware Products, Inc.)

For more data circle No. 58 on postcard, p. 129

Ultrasonic Transducer Operates in Big Tanks

All-welded, this stainless steel ultrasonic immersion transducer provides 52 sq in. of radiating area for tanks and vats of unlimited volume. A new method of coupling and reinforcing the crystal transducers through solid metal machining elements gives nearly 90-pct conversion of energy. It also results in exceptional ruggedness and long life, the maker says. Production and performance tests indicate that its seam welding construction eliminates former chemical and cavitation erosion hazards. The transducer will work 24-hours a day indefinitely in all known solvents. It can be used in conveyorized automatic parts cleaning machines. Operation is at 20,000 cycles per second. This frequency is recommended as most effective. (General Ultrasonics Co.)

For more data circle No. 59 on postcard, p. 129



Floor Machines

Heavy duty floor working machines in a line now feature models with 14, 16, 18 and 22-in. brushes. The latter is recommended for floor areas of 20,000 sq ft and up. The latest series machines, the 22-in. ones, have a heavy duty capacitor start motor. This drives a planetary system of steel helical gears at a 10 to 1 reduction ratio. The brush, operating at 170 rpm, starts easily even under heavy loads. (Brever Mfg. Co.)

For more data circle No. 60 on postcard, p. 129

Welder's Eyeshield

Claimed to make welding a "pleasure" for welders who wear bifocal glasses is an optical accessory for welding helmet windows. Designed for use with personal glasses, it fits behind the regular helmet filter lens. (Sellstrom Mfg. Co.)

For more data circle No. 61 on postcard, p. 129

new McCaffrey MACGRAB TRADE MARK
combination magnet-grapple

handles more materials
FASTER, CHEAPER, EASIER!

With MacGrab's GIANT BITE your scrap-handling costs go *down*... speed and efficiency go *up*. Baled materials, small loose or prepared scrap, springy stuff, *scrap metals of any kind*, clean-up jobs... they're all the same to MacGrab's powerful magnet and keenly pointed tines. Positive closing power is applied to all four tines. MacGrab's simple construction means fewer moving parts to wear out, yet less weight than any unit of similar capacity. Your operator can use either the grapple or the magnet, or both at once... depending on the job. MacGrab is built for ¾-yard or larger cranes, works easily in a standard 8-foot truck body.

MacGrab's savings *add profits for you* if working scrap is your business. Mail the coupon today for complete information.

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City_____ State_____

Thermocouple Features Long Life

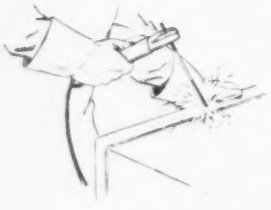
For molten metal measurements to 3100 F, this thermocouple uses a metal-ceramic secondary protecting tube, a vitrified alumina primary tube, and a platinum, platinum-10-pct-rhodium thermocouple. A curved stainless steel tube of any required length leads to a wooden grip and thermocouple assembly head. The standard model has 8 ft of armored connecting wire. All parts are stock items. The protecting tube provides long life with fast response and resistance to thermal shock. Life tests indicate that the secondary tube normally withstands about ten dips in molten steel between 2700° and 3100 F. Lower temperatures give proportionally longer life. (The Bristol Co.)

For more data circle No. 62 on postcard, p. 129

ARC-SPOT miller GENERATORS WELDERS

. . . WORLD'S LONGEST LINE OF WELDERS

Here's the List--



A-C Transformer Type
in 16 models from 20 to 800 amperes

A-C Submerged Arc Type
3 models, 150 to 1875 amperes

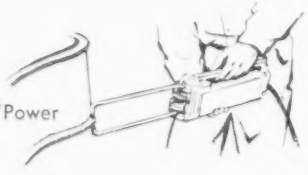
D-C Selenium Rectifier Type
12 models, 3 to 1500 amperes

D-C Selenium Rectifier Constant Potential Type
3 models, 300 to 1000 amperes

A-C/D-C Combinations for Metallic Arc Welding
6 models, 10 to 525 amperes

Spotwelders
14 models, 1.5 to 20 KVA

A-C and D-C Engine Driven Welders/Power Plants
6 models, 15 to 350 amperes



A-C/D-C Combinations for Inert Gas/Metallic Arc Welding
8 models, 10 to 550 amperes

A-C Inert Gas Welders
23 models, 5 to 700 amperes

High Frequency Units
9 models, up to 1000 ampere capacity

High Frequency Units with Water/Gas Controls
8 models, up to 1000 ampere capacity

PLUS: control panels, remote control units, water coolant systems, electrodes, electrode holders, running gear and welding accessories.

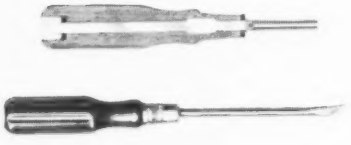
What's more, "... if it's Miller you know it's the finest..."

miller ELECTRIC MANUFACTURING CO., INC.
APPLETON • WISCONSIN

Distributed in Canada by Canadian Liquid Air Co., Ltd. Montreal, P.Q.

Screwdrivers

New-type industrial screwdrivers feature a hardened and tempered tool-steel bar. This extends through a fluted hardwood handle and is winged to prevent turning. A steel cap is pressure fitted over the top



of the bar. Built to withstand consistently hard daily use in factories and mills, these drivers come in eight sizes, ranging from 2 to 12-in. long. The steel cap feature prevents mushrooming, chipping and splitting of the handle. (The Stanley Works)

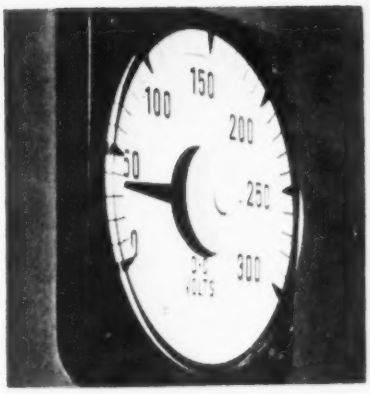
For more data circle No. 63 on postcard, p. 129

Gear Lubricants

Gear lubes compounded with chlorine, sulphur, lead and highly refined mineral oils provide lubrication for heavy duty gear trunnion bearing and speed reducer applications. Their lubricating qualities depend upon a tenacious monomolecular film on metal surfaces. These inhibited lubricants have very good high temperature stability. (Bel-Ray Co., Inc.)

For more data circle No. 64 on postcard, p. 129

Mill Switchboard Instruments Read Easily



Surpassing ASA readability standards by 200 pct, this switchboard instrument is made for easy reading at better than 120° angles. The instrument is particularly useful for mill operations where distant angular readings must be taken. It can, though, be used for general switchboard service, control panels and special test equipment. Its makers recommend the unit for use on swinging brackets or other installations that are remote from the observer. Switchboard instruments with the new readability factor include: voltmeters, ammeters, wattmeters, frequency meters, power-factor meters, varmeters, synchroscopes, temperature meters and ground detectors. Cover overhang is nil on the unit. The observer can read its markings easily regardless of the angle of illumination. (General Electric Co.)

For more data circle No. 65 on postcard, p. 129

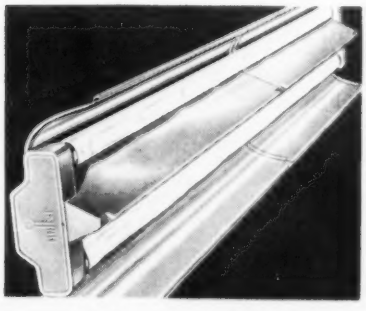
Wire Trimmer

Designed for high-production runs, a new rugged high-speed wire trimming machine is simple to operate. It gives a clean cut-off and operates at 450 strokes per minute. The maximum capacity that can be used is 5 16-in. diam. The machine comes complete with a ¾-hp motor. (Artys Sales Co.)

For more data circle No. 66 on postcard, p. 129

Plant Lamp Fixture

This 8-ft fixture efficiently harnesses the 26,000-lumen output of two General Electric grooved fluorescent lamps. It provides comfortable seeing for industrial users. Designed specifically for use with this source, it features an aluminum reflector with 35° cross-



wise shielding. This limits brightness within the shielded zone. Thus, users are assured a high degree of crosswise seeing comfort, and are able to obtain high levels of light with fewer fixtures. (The Miller Co.)

For more data circle No. 67 on postcard, p. 129

and . . .

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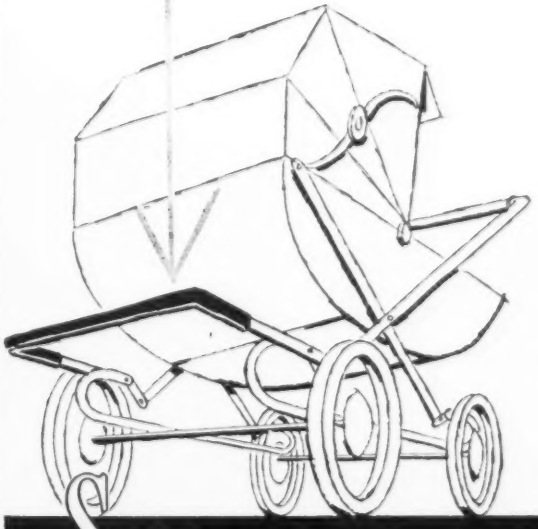
BUGGY

BUMPERS

All rubber part requirements are not unusual. Yes . . . we have produced parts in rubbers that have traveled far into space on our fastest jet fighters and bombers . . . and we regularly produce parts that meet the requirements of the family auto.

Stalwart is comprised of rubber specialists. Men who are capable of compounding specialized rubbers that can be fabricated into the parts and products that you produce. Production men will see to it that these parts are made to exacting specifications and delivered to you at the right price.

Check with STALWART FIRST . . . if you have a rubber part problem involving temperatures, abrasion, weathering, chemicals, petroleums or a combination of these. Check with STALWART FIRST . . . if the part is intricate . . . or if it is just a . . . rubber baby buggy bumper!



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The Iron Age Summary

Price Hedging Lifts Mill Hopes

Mills detect signs that customers are ordering against expected July price boost.

Behind hedge buying are indications that price rise will be higher than expected.

■ Hedge buying against higher prices is giving the steel market a slight lift this week. It doesn't amount to much as yet. But some users seem more inclined to stock up before the July price boost than they were several months ago.

The reason for this is that steel mills are thinking in terms of a price boost comparable with last year's average $8.50 a ton. Some have suggested that the increase should be even more than $8.50. This is quite a bit higher than earlier unofficial estimates of $5-$6 a ton.

Hopeful Signs — Several mills have noted a pickup recently in demand for hot-rolled sheet. Some of this business is coming from automotive companies. The auto producers claim their orders do not reflect better business. May production schedules are running 14 pct above May of last year, but output was cut back last May in the face of slow sales. Mostly, they say, they're plugging gaps in their steel inventories' which have been cut drastically in recent months.

There are hopeful signs that other steel users may be contributing to the price hedge pickup in the same way—by maintaining their inventories at present levels rather than continuing their policy of cutbacks.

Meanwhile, the declining zinc price is giving some steel customers a break. As a result of the decline, the zinc extra on galvanized sheet has been reduced. On the basis of last week's 1½¢ drop, flat galvanized sheet with commercial coating declined from 80¢ a ton on 8-gage to $5 a ton on 30-gage. Galvanized pipe prices were off $2 to $4 a ton depending on diameter. A further drop in zinc price this week will not mean additional cuts in the extras on these steel products.

Straws In Wind—Another optimistic straw-in-the-wind comes from Pittsburgh, where a large mill reports that its order backlog has increased slightly in the last two weeks. Also, a Pittsburgh sheet warehouse says there has been a strong upswing in sales this month.

On the gloomy side, most steel users are holding firm to the driver's seat. The customers are so insistent on quality that mills are making concessions that amount to price cuts. In short, some users are paying commercial quality price for special quality steel.

Oil Country Easing?—Some purchasing agents say they are being offered extra tonnages of oil country seamless. They add that supply has loosed markedly; that inventories are comfortable.

Steel Output, Operating Rates

Production (Net tons, 000 omitted)	This Week	Last Week	Month Ago	Year Ago
	2,253	2,228	2,317	2,363
Ingot Index (1947-1949=100)	140.2	138.6	144.2	147.1
Operating Rates				
Chicago	87.0	85.0*	88.0	100.0
Pittsburgh	93.0	92.0*	94.0	99.0
Philadelphia	103.0	102.0	103.0	101.0
Valley	79.0	78.0*	87.0	98.0
West	104.5	103.5*	100.0	97.5
Buffalo	85.5	85.5	93.0	105.0
Cleveland	87.0	86.5	90.0	101.0
Detroit	85.0	87.0	98.0	100.0
S. Ohio River	78.0	70.0*	63.0	94.0
South	94.0	95.5	95.5	23.5
Upper Ohio R.	88.0	84.0*	87.0	102.0
St. Louis	85.0	84.0	99.0	94.0
Northeast	64.0	63.0	64.0	87.0
Aggregate	88.0	87.0	90.5	96.0

*Revised

Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	5.670	5.670	5.670	5.179
Pig Iron (Gross ton)	$64.56	$64.56	$64.56	$60.29
Scrap, No. 1 hvy (Gross ton)	$45.83	$44.17	$42.17	$50.33
Nonferrous				
Aluminum ingot	27.10	27.10	27.10	25.90
Copper, electrolytic	32.00	32.00	32.00	46.00
Lead, St. Louis	15.30	15.80	15.80	15.80
Magnesium ingot	36.00	36.00	36.00	34.50
Nickel, electrolytic	74.00	74.00	74.00	34.50
Tin, Straits, N. Y.	97.625	98.50	99.875	97.125
Zinc, E. St. Louis	11.50	12.00	13.50	13.50

*Revised

Inventory Filling Peps Up Sheet

Customers replacing depleted stocks are helping out current sheet-strip ordering.

While not major upswing, it's encouraging flat-rolled producers and distributors.

■ Consumer buying to plug inventory gaps is giving a slight lift to the sheet and strip market. Both mills and warehouses in heavy sheet-strip consuming districts are feeling its effects.

The slightly accelerated tempo—certainly no cause for wild cheering yet—apparently stems mostly from user concern over depleted stocks. Majority of the orders are in the "rush" category.

Cold-rolled strip, cold-roiled and galvanized sheet are showing the most improvement at Pittsburgh warehouses. Producers there are also encouraged. One reports larger sheet backlogs, another hopes for capacity operations or better through the month of July.

Detroit Hopeful — Hot-rolled sheet is spearheading a mild advance at Chicago—lengthening mill delivery schedules by about a week. Two factors are supporting optimism in the automotive sheet market at Detroit: (1) industry output for May is scheduled at 14 pct above that of the same month in '56 and (2) dangerously low inventories could well prod the carmakers into more buying.

All in all, while sheet producers and sellers are far from out of the woods, a little daylight is beginning to break through.

Sheet and Strip — Hopes for a pickup, at least in hot-rolled sheet, are getting some encouragement. Mill delivery times are lengthening a little over previous levels. And there are indications that business may hold up fairly well over the summer.

No thundering rush to place third quarter sheet and strip orders is evident in the **Philadelphia** market, although business is holding at fair levels.

Detroit is climbing on the optimism bandwagon as auto output for May is scheduled at a rate 14 pct above that of May, 1956. Also negatively encouraging is the low state of customer inventories. June orders are showing increases and it looks as though July, too, will be up.

Warehousemen on the **West Coast** are trying to work off heavy sheet stocks.

Plates and Shapes— With allocation still the way of life, there are a few encouraging signs for users.

Mill sales personnel at **Chicago** are getting more heavy and light standard structurals, and bar shapes for disposal. In a few cases warehouses there have turned down some offered tonnage of light structurals. However, small fabricators, bidding on structural jobs for five to seven month delivery, still seem to be gambling on getting the steel. Mills have 30 to 60 day carryovers in wide-flange structurals. Some report the same condition on heavy standard structurals. Light plate continues strong in the Chicago market. There are also mill carryovers of 30 days and higher in wide width and heavy thickness plate.

Large structural producer at **Philadelphia** doesn't see a true easing of the market, although some allotted tonnage not accepted by customers has been offered to others—and snapped up.

Plate business at **Detroit** is good, although light gage market is somewhat saturated. Heavy plate and structurals are in short supply.

On the **West Coast** the structural market is feeling the first signs of softness in a year and the mills look for a further easing in demand. Wide flange beams are also showing signs of slacking off.

Bars — Demand for hot-rolled product continues to hold farily strong at **Chicago,** although delivery times are still short. Rollings of light bar shapes and bar size angles are largely responsible. Despite some wharehouse business in cold finished, the producers are mostly on low work weeks, some of three or four days.

Bar production from the **Fairless Works** of United States Steel will not be available during the last two weeks in May. Company is shutting down its bar mill for that period and vacationing employees. Bar market at **Philadelphia** is off.

Market outlook at **Detroit** is hardly encouraging as one producer is still booking orders for the current month. Same mill has been warned by one customer not to overship on any order releases.

West Coast mills report reinforcing bar orders are coming in slowly, but they hope for a pickup from buyers by the end of May for channel construction work.

PURCHASING AGENT'S CHECKLIST

Steel warehouses are stressing service and lower cost as their prime sales tools. **P. 67**

Ceramics are playing a bigger role in the jet age. **P. 74**

Auto parts makers go after diverse markets. **P. 107**

COMPARISON OF PRICES

(Effective May 14, 1957)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in **Heavy Type**; declines appear in *Italics*.

	May 14 1957	May 7 1957	Apr. 16 1957	May 15 1956
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.675¢	4.675¢	4.675¢	4.325¢
Cold-rolled sheets	5.75	5.75	5.75	5.325
Galvanized sheets (10 ga.)	6.30	6.30	6.30	5.85
Hot-rolled strip	4.675	4.675	4.675	4.325
Cold-rolled strip	6.870	6.870	6.870	6.28
Plate	4.87	4.87	4.87	4.52
Plates, wrought iron	10.40	10.40	10.40	10.40
Stainl's C-R strip (No. 302)	50.00	50.00	50.00	44.50
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) coke	$10.30	$10.30	$9.95	$9.85
Tin plates, electro (0.50 lb.)	9.00	9.00	8.65	8.55
Special coated mfg. ternes	9.55	9.55	9.20	9.10
Bars and Shapes: (per pound)				
Merchant bars	5.075¢	5.075¢	5.075¢	4.65¢
Cold finished bars	6.85	6.85	6.85	5.90
Alloy bars	6.125	6.125	6.125	5.65
Structural shapes	5.00	5.00	5.00	4.60
Stainless bars (No. 302)	43.25	43.25	43.25	38.25
Wrought iron bars	11.50	11.50	11.50	11.50
Wire: (per pound)				
Bright wire	7.20¢	7.20¢	7.20¢	6.60¢
Rails: (per 100 lb.)				
Heavy rails	$5.275	$5.275	$5.275	$4.725
Light rails	6.25	6.25	6.25	5.65
Semifinished Steel: (per net ton)				
Rerolling billets	$74.00	$74.00	$74.00	$68.50
Slabs, rerolling	74.00	74.00	74.00	68.50
Forging billets	91.50	91.50	91.50	84.50
Alloy blooms, billets, slabs	107.00	107.00	107.00	96.00
Wire Rod and Skelp: (per pound)				
Wire rods	5.80¢	5.80¢	5.80¢	5.025¢
Skelp	4.625	4.625	4.625	4.225
Finished Steel Composite: (per pound)				
Base price	5.670¢	5.670¢	5.670¢	5.179¢

	May 14 1957	May 7 1957	Apr. 16 1957	May 15 1956
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$68.88	$68.88	$68.88	$65.26
Foundry, Valley	65.00	65.00	65.00	60.50
Foundry, Southern Cin'ti	67.17	67.17	67.17	62.93
Foundry, Birmingham	59.00	59.00	59.00	55.00
Foundry, Chicago	65.00	65.00	65.00	60.50
Basic, del'd Philadelphia	68.38	68.38	68.38	64.48
Basic, Valley furnace	64.50	64.50	64.50	60.00
Malleable, Chicago	65.00	65.00	65.00	60.50
Malleable, Valley	65.00	65.00	65.00	60.50
Ferromanganese, cents per lb. 74 to 76 pct Mn base.	12.75¢	12.75¢	12.75¢	9.50¢
Pig Iron Composite: (per gross ton)				
Pig iron	$64.56	$64.56	$64.56	$60.29
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	**$46.50**	$44.50	$41.50	$48.50
No. 1 steel, Phila. area	**49.50**	48.50	45.50	55.50
No. 1 steel, Chicago	**41.50**	39.50	39.50	48.50
No. 1 bundles, Detroit	39.00	39.00	34.50	46.50
Low phos., Youngstown	**47.50**	46.50	41.50	56.50
No. 1 mach'y cast, Pittsburgh	**53.50**	52.50	49.50	56.50
No. 1 mach'y cast, Philadel'a	55.50	55.50	55.50	55.50
No. 1 mach'y cast, Chicago	45.50	45.50	45.50	52.50
Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	**$45.83**	$44.17	$42.17	$50.33
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$15.38	$15.38	$15.38	$14.50
Foundry coke, prompt	$17.50-$19	$17.50-$19	$17.50-$19	$17.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	32.00	32.00	32.00	46.00
Copper, Lake, Conn.	32.00	32.00	32.00	46.00
Tin, Straits, New York	97.625‡	98.50	99.875	97.125
Zinc, East St. Louis	*11.50*	12.00	13.50	13.50
Lead, St. Louis	*15.50*	15.80	15.80	15.80
Aluminum, virgin ingot	27.10	27.10	27.10	25.90
Nickel, electrolytic	74.00	74.00	74.00	64.50
Magnesium, ingot	36.00	36.00	36.00	34.50
Antimony, Laredo, Tex.	33.00	33.00	33.00	33.00

† Tentative. ‡ Average. * Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Averages of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b. subject to switching charges.

← To identify producers, see Key on P. 164 →

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	66.50	67.00	67.50	68.00	.....
Birmingham *R3*	58.50	59.00*	.....	.....	.....
Birmingham *W9*	58.50	59.00*	63.00	.....	.....
Birmingham *U4*	58.50	59.00*	63.00	.....	.....
Buffalo *R3*	64.50	65.00	65.50	66.00	.....
Buffalo *H1*	64.50	65.00	65.50	66.00	.....
Buffalo *W6*	64.50	65.00	65.50	66.00	.....
Chester *P2*	66.50	67.00	67.50	...	.....
Chicago *I4*	64.50	65.00	65.00	65.50	.....
Cleveland *A5*	64.50	65.00	65.00	65.50	69.50†
Cleveland *R3*	64.50	65.00	65.00	65.50	.....
Duluth *I4*	64.50	65.00	65.00	65.50	69.50†
Erie *I4*	64.50	65.00	65.00	65.50	69.50†
Everett *M6*	66.00	66.50	67.00	.....	.....
Fontana *K1*	72.50	73.00	.....	.....	.....
Geneva, Utah *C7*	64.50	65.00	.....	.....	.....
Granite City *G2*	66.40	66.90	67.40	.....	.....
Hubbard *Y1*	.....	.....	65.00	.....	.....
Ironton, Utah *C7*	64.50	65.00	.....	.....	.....
Midland *C11*	64.50	.....	.....	.....	.....
Minnequa *C6*	66.50	67.00	67.50	68.00	.....
Monessen *P6*	64.50	.....	.....	.....	.....
Neville Is. *P4*	64.50	65.00	65.00	65.50	69.50†
N. Tonawanda *T1*	.....	65.00	65.50	66.00	.....
Sharpsville *S3*	64.50	65.00	65.00	65.50	.....
So. Chicago *R3*	64.50	65.00	65.00	.....	.....
Swedeland *A2*	66.50	67.00	67.50	68.00	.....
Toledo *I4*	64.50	65.00	65.00	65.50	.....
Troy, N. Y. *R3*	66.50	67.00	67.50	68.00	72.50
Youngstown *Y1*	.....	.....	65.00	65.50	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. * Add $1.00 for 0.31–0.69 pct phos. † Intermediate low phos. ‡ Add $1.00 for 0.31 to 0.50 pct phos.

Silvery Iron: Buffalo (6 pct), *H1*, $78.50; **Jackson**, *J1, I4* **(Globe Div.)**, $77.25; **Niagara Falls** (15.01-15.50), $101.00; **Keokuk** (14.01-14.50), $103.50; (15.51-16.00), $106.50. **Add $1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 18 pct. Add $1.25 for each 0.50 pct manganese over 1.00 pct. Bessemer silvery pig iron (under .10 pct phos.):** $64.00. **Add $1.00 premium for all grades silvery 6 pct to 14 pct.**

STAINLESS STEEL

Base price cents per lb f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	21.25	22.75	22.25	24.25	—	26.00	38.25	31.00	35.50	—	18.00	27.75	16.25
Slabs, billets	26.00	29.00	27.00	30.25	30.75	32.00	47.50	38.50	44.75	—	20.75	—	21.00
Billets, forging	—	35.00	35.75	36.50	39.50	39.00	59.75	45.25	53.50	30.75	27.25	27.75	27.75
Bars, struct.	40.50	41.25	42.50	43.25	46.25	46.00	70.25	53.25	62.25	36.25	32.50	33.00	33.00
Plates	42.50	43.25	44.50	45.50	48.00	48.75	73.75	57.50	67.00	38.75	33.75	35.50	34.50
Sheets	46.75	47.25	49.25	50.00	—	53.25	78.25	63.00	76.25	46.50	38.75	46.50	39.25
Strip, hot-rolled	34.50	37.50	35.75	39.00	—	42.50	66.50	51.50	61.00	—	29.75	—	30.75
Strip, cold-rolled	43.25	47.25	45.75	50.00	—	53.25	78.25	63.00	76.25	46.50	38.75	46.50	39.25
Wire CF; Rod HR	—	39.25	40.25–40.50	41.00–41.25	44.00	43.75	66.75–67.00	50.50–51.00	59.25–59.50	34.50	31.00	31.50	31.50

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11*; Brackenridge, Pa., *A3*; Butler, Pa., *A7*; Vandergrift, Pa., *U1*; Washington, Pa., *W1, J3*; Baltimore, *E1*; Middletown, O., *A7*; Massillon, O., *R3*; Gary, *U1*, Bridgeville, Pa., *U2*; New Castle, Ind., *I3*; Ft. Wayne, *J4*.

Strip: Midland, Pa., *C11*; Waukegan, Cleveland, *A5*; Carnegie, Pa., *S9*; McKeesport, Pa., *F1*; Reading, Pa., *C2*; Washington, Pa., *W2*; W. Leechburg, Pa., *A3*; Bridgeville, Pa., *U2*; Detroit, *M2*; Canton-Massillon, O., *R3*; Harrison, N. J., *D3*, Youngstown, *C5*; Sharon, Pa., *S1*; Butler, Pa., *A7*; Wallingford, Conn., *U3* (plus further conversion extras); *W1*; New Bedford, Mass. (.25¢ per lb higher), *R6*; Gary, *U1* (.25¢ per lb higher).

Bar: Baltimore, *A7*; S. Duquesne, Pa., *U1*; Munhall, Pa., *U1*; Reading, Pa., *C2*; Titusville, Pa., *U2*; Washington, Pa *J2*; McKeesport, Pa., *U1, F1*; Bridgeville, Pa., *U2*; Dunkirk, N. Y., *A3*; Massillon, O., *R3*; S. Chicago, *U1*; Syracuse, N. Y *C11*; Watervliet, N. Y., *A3*; Waukegan, *A5*; Canton, O., *T5*; Ft. Wayne, *I4*; Philadelphia, *D5*; Detroit, *R5*; Gary, *U1*.

Wire: Waukegan, *A5*; Massillon, O., *R3*; McKeesport, Pa., *F1*; Ft. Wayne, *J4*; Harrison, N. J., *D3*; Baltimore, *A7* Dunkirk, *A3*; Monessen, *P1*; Syracuse, *C11*; Bridgeville, *U2*.

Structurals: Baltimore, *A7*; Massillon, O., *R3*; Chicago, Ill., *J4*; Watervliet, N. Y., *A3*; Syracuse, *C11*; S. Chicago, *U1*

Plates: Brackenridge, Pa., *A3*; Chicago, *U1*; Munhall, Pa., *U1*; Midland, Pa., *C11*; New Castle, Ind., *I3*; Middletown *A7*; Washington, Pa., *J2*; Cleveland, Massillon, *R3*; Coatesville, Pa., *C15*; Philadelphia, *D5*; Vandergrift, Pa., *U1*; Gary, *U1*

Forgings billets: Midland, Pa., *C11*; Baltimore, *A7*, Washington, Pa., *J2*; McKeesport, *F1*; Massillon, Canton, O., *R3*; Watervliet, *A3*; Pittsburgh, Chicago, *U1*; Syracuse, *C11*; Detroit, *R5*, Munhall, Pa., S. Chicago, *U1*.

Scarce Scrap Brings Higher Prices

Dealer inventories are low and higher prices are necessary to bring out tonnages.

Mills hold good inventories, but even small purchases get close scrutiny from brokers.

■ Good scrap is hard to get. This fact, more than any immediate need of the mills, is behind the upturn in scrap prices.

For the second week, the general price increase continues. Mill orders aren't heavy and price increases in many markets are based on small tonnages. But in almost every case where mills venture into the market, higher prices are necessary to bring out the scrap.

Dealers' stocks are low and dealers feel no need to move what they have. Brokers are hesitant to cover more than the smallest orders, for fear of further increases before they are filled.

Brokers admit that it's easier to sell scrap than to buy. Under these conditions, the only way for the market to go is up.

But a runaway market is not likely. Although the operating rate is tending to strengthen on the basis of some new zest in the steel market, mills aren't in desperate need of scrap.

THE IRON AGE Composite Price climbed again to $45.83, up from $44.17, price a week ago.

Pittsburgh—Prices of openhearth grades are up $2 here. Brokers are bidding high for scarce dealer stocks in attempts to cover mill orders estimated from 60,000 up to 100,000 tons. Low phos is up $2 on small purchases. Factory bundles and turnings are up $1 in sympathy with general market gains. Latest railroad list showed gains of from $1 to $3 over offerings less than a week earlier. One mill here is reported short of scrap, but consumers generally have comfortable inventories and are not pushing for shipment.

Chicago—While local mill buying is at a very low volume, scattered purchases are at least $2 higher. Brokers are extremely hesitant to cover more than small-lot purchases at going prices. Dealer activity is down sharply. Fresh purchases for eastern shipment at Minneapolis, Milwaukee and other points have reduced supplies in the Chicago area.

Philadelphia—This market continues firm. One mill is reported paying $50 for No. 1 dealer bundle. A sale of No. 1 heavy melting was reported at $50, up $1. Good scrap is scarce and brokers say it is easier to make sales than to buy. Exporters are having trouble.

New York — New strength has hit this market. Steelmaking grades are up as much as $2 per ton, with No. 1 heavy melting quoted with a top of $46. Blast furnace and cast grades are up $1. Continuous strong level of exports and new buying by domestic mills have firmed prices. Dealer stocks are low.

Detroit — The market continues to drift along at current levels. Indications are that it will not move now until the end of the month. Both brokers and dealers are cautious in their predictions, but it is felt that prices will either stay the same or move up slightly on June auto lists. Lack of dealer scrap is one factor behind firm prices.

Cleveland—The market showed some price weakness when a fringe Valley mill bought moderate tonnage $1 under going market. The buy will serve as a test of whether a flurry of smaller orders had underlying strength. Railroad prices continue a small advance. Rail lists are climbing because of the small tonnage offered.

St. Louis — Although the steel operating is down, scrap receipts continue below requirements. Scrap is not moving because it is not to be had or because prices are too low. The market is strong at present levels.

Birmingham — The downward trend of scrap prices in this district seems to have been halted. A nearby openhearth consumer bought a good tonnage of No. 2 heavy melting up an average of $2.50. Brokers say the small amount of dealer scrap and pressure of exports caused the rise.

Cincinnati — Dealers continue optimistic for near future and feel downtrend has hit bottom. But no new orders are out at the moment and the market is in a lull.

Buffalo — The market is unchanged, with no new activity. Influx of scrap via the Great Lakes and lower steel operating rate are tending to weaken the market.

Boston—Prices of No. 1 steelmaking grades are up $1 for the second successive week. There is slightly more activity. Export is increased a little. New England mills are still out of the market. Domestic purchases are from eastern Pennsylvania.

West Coast—Prices are firm in all Coast cities. Mill inventories are at healthy levels and mills are waiting out the price picture. Price of No. 1 heavy melting, Seattle, should have been $46 in May 9 issue.

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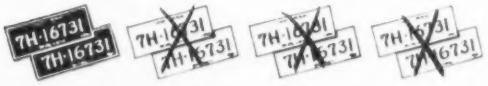

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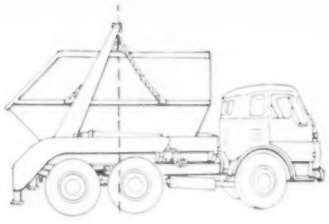
Only *one rig* to insure.*

*No maintenance, license plates or insurance are needed for Load Lugger containers.



Safer handling, easier driving. Weight of load is distributed more evenly over front and rear of truck —center of gravity of load is *ahead* of rear axle.

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SCRAP PRICES *(Effective May 14, 1957)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$46.00 to $47.00
No. 2 hvy. melting	43.00 to 44.00
No. 1 dealer bundles	46.00 to 47.00
No. 1 factory bundles	51.00 to 52.00
No. 2 bundles	41.00 to 42.00
No. 1 busheling	46.00 to 47.00
Machine shop turn.	31.00 to 32.00
Mixed bor. and ms. turn.	31.00 to 32.00
Shoveling turnings	35.00 to 36.00
Cast iron borings	35.00 to 36.00
Low phos. punch'gs plate	51.00 to 52.00
Heavy turnings	44.00 to 45.00
No. 1 RR. hvy. melting	51.00 to 52.00
Scrap rails, random lgth.	61.00 to 62.00
Rails 2 ft and under	67.00 to 68.00
RR. steel wheels	60.00 to 61.00
RR. spring steel	60.00 to 61.00
RR. couplers and knuckles	60.00 to 61.00
No. 1 machinery cast	53.00 to 54.00
Cupola cast	45.00 to 46.00
Heavy breakable cast	43.00 to 44.00

Chicago

No. 1 hvy. melting	$41.00 to $42.00
No. 2 hvy. melting	39.00 to 40.00
No. 1 dealer bundles	41.00 to 42.00
No. 1 factory bundles	46.00 to 47.00
No. 2 bundles	34.00 to 35.00
No. 1 busheling	41.00 to 42.00
Machine shop turn.	24.00 to 25.00
Mixed bor. and turn.	26.00 to 27.00
Shoveling turnings	26.00 to 27.00
Cast iron borings	26.00 to 27.00
Low phos. forge crops	52.00 to 53.00
Low phos. punch'gs plate	47.00 to 48.00
Low phos. 3 ft and under	46.00 to 47.00
No. 1 RR. hvy. melting	48.00 to 49.00
Scrap rails, random lgth.	53.00 to 54.00
Rerolling rails	57.00 to 58.00
Rails 2 ft and under	57.00 to 58.00
Locomotive tires cut	53.00 to 54.00
Cut bolsters & side frames	51.00 to 52.00
Angles and splice bars	55.00 to 56.00
RR. std. car axles	71.00 to 72.00
RR. couplers and knuckles	50.00 to 51.00
No. 1 machinery cast	45.00 to 46.00
Cupola cast	40.00 to 41.00
Heavy breakable cast	38.00 to 39.00
Cast iron brake shoe	39.00 to 40.00
Cast iron wheels	47.00 to 48.00
Malleable	54.00 to 55.00
Stove plate	39.00 to 40.00
Steel car wheels	52.00 to 53.00

Philadelphia Area

No. 1 hvy. melting	$49.00 to $50.00
No. 2 hvy. melting	40.00 to 41.00
No. 1 dealer bundles	49.00 to 50.00
No. 2 bundles	38.00 to 39.00
No. 1 busheling	49.00 to 50.00
Machine shop turn.	33.00 to 34.00
Mixed bor. short turn.	35.00 to 36.00
Cast iron borings	33.00 to 34.00
Shoveling turnings	36.00 to 37.00
Clean cast chem. borings	39.00 to 40.00
Low phos. 5 ft and under	52.00 to 53.00
Low phos. 2 ft and under	52.00 to 54.00
Low phos. punch'gs	53.00 to 54.00
Elec. furnace bundles	50.00 to 51.00
Heavy turnings	44.00 to 45.00
RR. steel wheels	57.50 to 58.50
RR. spring steel	57.50 to 58.50
Rails 18 in. and under	65.00 to 66.00
Cupola cast	42.00 to 44.00
Heavy breakable cast	53.00 to 54.00
Cast iron car wheels	57.00 to 58.00
Malleable	61.00 to 62.00
Unstripped motor blocks	37.00 to 38.00
No. 1 machinery cast	55.00 to 56.00

Cleveland

No. 1 hvy. melting	$41.00 to $42.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 dealer bundles	41.00 to 42.00
No. 1 factory bundles	46.00 to 47.00
No. 2 bundles	34.00 to 35.00
No. 1 busheling	41.00 to 42.00
Machine shop turn.	22.00 to 23.00
Mixed bor. and turn.	26.00 to 27.00
Shoveling turnings	26.00 to 27.00
Cast iron borings	26.00 to 27.00
Cut struct'r'l & plates, 2 ft & under	47.00 to 48.00
Drop forge flashings	41.00 to 42.00
Low phos. punch'gs, plate	42.00 to 43.00
Foundry steel, 2 ft & under	42.00 to 43.00
No. 1 RR. heavy melting	46.00 to 47.00
Rails 2 ft and under	69.00 to 70.00
Rails 18 in. and under	70.00 to 71.00
Railroad grate bars	32.00 to 33.00
Steel axle turnings	30.00 to 31.00
Railroad cast	53.00 to 54.00
No. 1 machinery cast	51.00 to 52.00
Stove plate	48.00 to 49.00
Malleable	56.00 to 57.00

Youngstown

No. 1 hvy. melting	$44.00 to $45.00
No. 2 hvy. melting	39.00 to 40.00
No. 1 dealer bundles	44.00 to 45.00
No. 2 bundles	37.00 to 38.00
Machine shop turn.	20.00 to 21.00
Shoveling turnings	27.00 to 28.00
Cast iron borings	27.00 to 28.00
Low phos. plate	45.00 to 46.00

Buffalo

No. 1 hvy. melting	$40.00 to $41.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 busheling	40.00 to 41.00
No. 1 dealer bundles	40.00 to 41.00
No. 2 bundles	32.00 to 33.00
Machine shop turn.	26.00 to 27.00
Mixed bor. and turn.	27.00 to 28.00
Shoveling turnings	31.00 to 32.00
Cast iron borings	27.00 to 28.00
Low phos. plate	44.00 to 45.00
Scrap rails, random lgth.	56.00 to 57.00
Rails 2 ft and under	60.00 to 61.00
RR. steel wheels	49.00 to 50.00
RR. spring steel	49.00 to 50.00
RR. couplers and knuckles	49.00 to 50.00
No. 1 machinery cast	44.00 to 45.00
No. 1 cupola cast	40.00 to 41.00

Detroit

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$37.50 to $38.50
No. 2 hvy. melting	29.00 to 30.00
No. 1 dealer bundles	38.50 to 39.50
No. 2 bundles	29.00 to 30.00
No. 1 busheling	37.50 to 38.50
Drop forge flashings	37.50 to 38.50
Machine shop turn.	20.00 to 21.00
Mixed bor. and turn.	23.00 to 24.00
Shoveling turnings	23.00 to 24.00
Cast iron borings	23.00 to 24.00
Low phos. punch'gs, plate	37.50 to 38.50
No. 1 cupola cast	46.00 to 47.00
Heavy breakable cast	42.00 to 43.00
Stove plate	43.00 to 44.00
Automotive cast	52.00 to 53.00

St. Louis

No. 1 hvy. melting	$41.00 to $42.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 dealer bundles	41.00 to 42.00
No. 2 bundles	32.00 to 33.00
Machine hop turn.	22.00 to 23.00
Cast iron borings	24.00 to 25.00
Shoveling turnings	24.00 to 25.00
No. 1 RR. hvy. melting	45.00 to 46.00
Rails, random lengths	48.00 to 49.00
Rails 18 in. and under	58.00 to 59.00
Locomotive tires uncut	50.00 to 51.00
Angles and splice bars	54.00 to 55.00
Std. steel car axles	67.00 to 68.00
RR. specialties	47.00 to 48.00
Cupola cast	40.00 to 41.00
Heavy breakable cast	35.00 to 36.00
Cast iron brake shoes	36.00 to 37.00
Stove plate	39.00 to 40.00
Cast iron car wheels	42.00 to 43.00
Rerolling rails	58.00 to 59.00
Unstripped motor blocks	37.00 to 38.00

Boston

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	28.00 to 29.00
No. 1 dealer bundles	37.00 to 38.00
No. 2 bundles	27.50 to 28.50
No. 1 bush'ling	37.00 to 38.00
Elec. furnace, 3 ft & under	39.00 to 40.00
Machine shop turn.	21.00 to 22.00
Mixed bor. and short turn.	23.00 to 24.00
Shoveling turnings	24.00 to 25.00
Clean cast. chem. borings	28.00 to 29.00
No. 1 machinery cast	42.00 to 43.00
Mixed cupola cast	34.00 to 35.00
Heavy breakable cast	42.00 to 43.00
Stove plate	32.00 to 33.00
Unstripped motor blocks	26.00 to 27.00

New York

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$45.00 to $46.00
No. 2 hvy. melting	35.00 to 36.00
No. 2 dealer bundles	32.00 to 33.00
Machine shop turn.	24.00 to 25.00
Mixed bor. and turn.	25.00 to 26.00
Shoveling turnings	27.00 to 28.00
Clean cast chem. borings	30.00 to 31.00
No. 1 machinery cast	44.00 to 45.00
Mixed yard cast	39.00 to 40.00
Charging box cast	44.00 to 45.00
Heavy breakable cast	44.00 to 45.00
Unstripped motor blocks	31.00 to 32.00

Birmingham

No. 1 hvy. melting	$39.00 to $40.00
No. 2 hvy. melting	33.00 to 34.00
No. 1 dealer bundles	39.00 to 40.00
No. 2 bundles	26.00 to 27.00
No. 1 busheling	39.00 to 40.00
Machine shop turn.	28.00 to 29.00
Shoveling turnings	30.00 to 31.00
Cast iron borings	27.00 to 28.00
Electric furnace bundles	45.50 to 46.50
Elec. furnace, 3 ft & under	43.50 to 44.50
Bar crops and plate	47.00 to 48.00
Structural and plate, 2 ft	46.00 to 47.00
No. 1 RR. hvy. melting	41.00 to 42.00
Scrap rails, random lgth.	50.00 to 51.00
Rails, 18 in. and under	56.00 to 57.00
Angles & splice bars	53.00 to 54.00
Rerolling rails	60.00 to 61.00
No. 1 cupola cast	47.50 to 48.50
Stove plate	47.00 to 48.00
Charging box cast	34.00 to 35.00
Cast iron car heels	38.00 to 39.00
Unstripped motor blocks	38.00 to 39.00

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$38.00 to $39.00
No. 2 hvy. melting	33.00 to 34.00
No. 1 dealer bundles	38.00 to 39.00
No. 2 bundles	30.00 to 31.00
Machine shop turn.	25.00 to 26.00
Mixed bor. and turn.	23.00 to 24.00
Shoveling turnings	28.00 to 29.00
Cast iron borings	23.00 to 24.00
Low phos. 18 in. & under	49.00 to 50.00
Rails, random lengths	54.00 to 55.00
Rails, 18 in. and under	64.00 to 65.00
No. 1 cupola cast	43.00 to 44.00
Hvy. breakable cast	40.00 to 41.00
Drop broken cast	53.00 to 54.00

San Francisco

No. 1 hvy. melting	$48.00
No. 2 hvy. melting	43.00
No. 1 dealer bundles	47.00
No. 2 bundles	35.00
Machine shop turn.	32.00
Cast iron borings	32.00
No. 1 RR. hvy. melting	48.00
No. 1 cupola cast	55.00

Los Angeles

No. 1 hvy. melting	$46.00
No. 2 hvy. melting	43.00
No. 1 dealer bundles	45.00
No. 2 bundles	33.00
Machine shop turn.	32.00
Shoveling turnings	34.00
Cast iron borings	31.00
Elec. furn. 1 ft and under (foundry)	57.00
No. 1 RR. hvy. melting	46.00
No. 1 cupola cast	$52.00 to 53.00

Seattle

No. 1 hvy. melting	$46.00
No. 2 hvy. melting	42.00
No. 2 bundles	$28.00 to 30.00
No. 1 cupola cast	47.00
Mixed yard cast	47.00

Hamilton, Ont.

No. 1 hvy. melting	$43.00
No. 2 hvy. melting	38.00
No. 1 dealer bundles	43.00
No. 2 bundles	32.00
Mixed steel scrap	40.00
Busheling	34.00
Bush., new fact., prep'd	43.00
Bush., new fact., unprep'd	37.00
Machine shop turn.	22.00
Short steel turn.	30.00
Mixed bor. and turn.	24.00
Rails, rerolling	54.00
Cast scrap	50.00

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Market Weak, Zinc Drops Again

Producers lower price second time in a week. Prime western is now 11½c at E. St. Louis.

Consumers betting lead price will fall another ½c, wait for decision on bartering.

■ For the second time in a week the price of zinc fell. New price is 11½¢ per lb for prime western, f.o.b. E. St. Louis. This is ½¢ below the price established May 6.

One major producer started charging the lower price May 13. Other producers were a little slow to follow, but most had made the switch by the next day.

Surprise Move — Although the drop could have been forecast, it took many consumers by surprise. The two major factors which drove the zinc price down further are: (1) consumer buying resistance, and (2) continued silence of the Agriculture Dept. on the inclusion of zinc in the barter program.

Most zinc buyers recognized the fact that zinc was weak and might fall again. But most felt that producers would hold out until something definite was announced about barter.

Will Resume Barter—Agriculture officials have indicated that the program will be resumed. But they have not said when, nor whether zinc would be included in the list of wanted materials. This is expected any day now.

In the light of this, most buyers consider the drop an aggressive effort by the zinc producers to strengthen the market, no matter what the government does. Whether it will work or not is questionable. Consumers were not ready to say whether the lower price would bring them into the market.

Lead

On May 9 the price of lead dropped ½¢ per lb, the first move in 16 months. But it may not be enough. Consumers say the market is much weaker, expect another ½¢ drop within a week or so.

Producers admit the lower price has not stimulated any additional business. They say it is entirely possible they will have to reduce their price still further. But they say another drop will depend on future events, specifically government barter program policy, not on current weakness.

Inventories Low — Ace-in-the-hole, say producers, is the fact that consumers' inventories are at rock bottom. One sales manager estimates his customers' stocks at three to four weeks. Consumers are making no effort to bring up stocks, are waiting for the lower price. Another lead company sales manager says customers who used to buy monthly are now buying less, on a weekly basis, and demanding immediate delivery.

Producers say this hand to mouth buying can continue for only another two to three weeks. If the government does not announce a decision on the status of the barter program by then, consumers will have to pick up buying.

Price Will Follow—If the government makes a decision before two or three weeks on the barter program, the price will act accordingly. Here's what the trade says will happen: (1) If barter of agricultural surplus for lead is resumed, the price of lead will firm up and probably hold. (2) If barter for lead is discontinued, the price will fall immediately.

An interesting sidelight to the situation is the fact that lead and zinc are drifting further apart as market "cousins." The two metals are mined in many cases from the same ore and have paralleled each other in price movement. Lead producers say this is no longer the case because: (1) New ore discoveries contain more zinc than lead, minimizing lead's overproduction; (2) Lead has less competition for its markets; and (3) Lead's biggest customer, batterymakers, do not depend as much on the condition of producing industries, but on replacement.

Brass

Rep. James T. Patterson, (R., Conn.), has introduced a new bill aimed at reducing the pressure of imports on the domestic brass mills.

The bill calls for quotas based on the average of the last five years, on a sliding scale.

Tin prices for the week: May 8—98.25; May 9—98.25; May 10—98.125; May 13—97.75; May 14—97.625.

*Estimate

Primary Prices

cents per lb	Current price	last price	date of change
Aluminum ingot	27.10	25.90	8 10 56
Aluminum pig	25.00	24.00	8 10 56
Copper (E)	32.00	34.00	2 18 57
Copper (CS)	30.00	30.50	5 9 57
Copper (L)	32.00	34.00	2 19 57
Lead, St. L.	15.30	15.80	5 9 57
Lead, N. Y.	15.50	16.00	5 9 57
Magnesium ingot	36.00	34.50	8 13 56
Magnesium pig	35.25	33.75	8 13 56
Nickel	74.00	64.50	12 6 56
Titanium sponge	250 275	270 300	12 4 56
Zinc, E. St. L.	11.50	12.00	5 13 57
Zinc, N. Y.	12.00	12.50	5 13 57

ALUMINUM: 99% ingot frt allwd. **COPPER:** (E) = electrolytic, (CS) = custom smelters, electrolytic, (L) = lake. **LEAD:** common grade. **MAGNESIUM:** 99.8% pig, Velasco, Tex. **NICKEL:** Port Colbourne, Canada. **ZINC:** prime western. **TIN:** see above; other primary prices, pg. 160.

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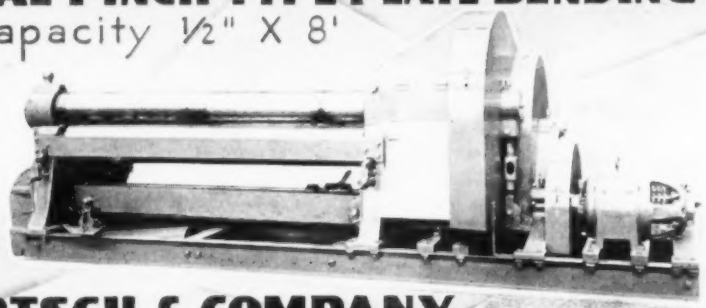

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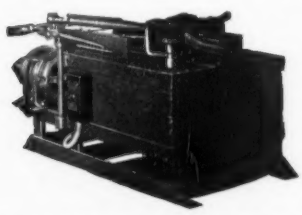
This is a powerful and fast machine for heavy duty work in both fabricating plants or in the field where large tonnage is required. It will handle as high as 20 tons a day. Circles of any size required in concrete reinforcing work from 18 inches in diameter up can be bent on this machine. It will bend bars with two or more radius on the same bar without stopping the machine.



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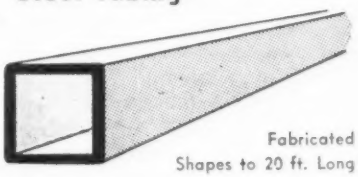

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MILL PRODUCTS

Cents per lb, unless otherwise noted

ALUMINUM

Base 30,000 lb, f.o.b. ship. pt., frt. allowed

Flat Sheet (Mill Finish) and Plate

("F" temper except 6061-0)

Alloy	.032	.081	.136-.249	.250-3
1890, 1100, 3003	44.3	42.1	40.9	40.2
5052	51.8	46.8	45.1	42.9
6061-0	48.9	44.6	42.8	42.6

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6-8	42.7-44.4	57.6-61.1
12-14	43.4-44.8	58.4-62.7
24-26	46.4-46.9	68.7-73.1
36-38	54.8-55.4	91.5-94.9

Screw Machine Stock—2011-T-3

Size"	½	⅝-⅞	1-1¼	1¼-1½
Price	59.7	58.8	57.4	55.2

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.352	$1.803	$2.254	$2.704
.024 gage	1.686	2.252	2.815	3.378

MAGNESIUM

F.o.b. shipping Pt., carload frt. allowed

Sheet and Plate

Type↓ Gage→	.250-3.00	.250-2.00	.188	.081	.032
AZ31B Stand. Grade		67.9	69.0	77.9	103.1
AZ31B Spec.		93.3	95.7	108.7	171.3
Tread Plate		70.6	71.7		
Tooling Plate	73.0				

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade (AZ31C)	69.6	70.7	75.6	89.3
Spec. Grade (AZ31B)	84.6	85.7	90.6	104.3

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	126	106	128
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	120	105	121
Seamless tube	157	129	200
Shot, blocks		87	

COPPER, BRASS, BRONZE

(Freight included on 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	54.18		51.36	54.32
Brass, 70-30	47.02	47.56	46.96	49.93
Brass, Low	49.80	50.44	49.84	52.71
Brass, R.L.	50.02	51.46	50.86	53.73
Brass, Naval	51.10		45.41	54.51
Muntz Metal	49.19		45.00	
Comm. Bz.	52.48	53.02	52.42	55.04
Mang. Bz.	54.84		48.94	
Phos. Bz. 5%	75.17		73.97	

Free Cutting Brass Rod 35.16

TITANIUM

(10,000 lb base, f.o.b. mill)

Sheet and strip, commercially pure, $11.00-$12.10; alloy, $14.75; Plate, HR, commercially pure $9.25-$9.75; alloy, $11.25. Wire, rolled and/or drawn, commercially pure, $8.50-$9.00; alloy, $11.00; Bar, HR or forged, commercially pure, $7.10-$7.35; alloy, $7.10-$7.30; billets, HR, commercially pure, $6.85-$7.10; alloy, $6.85-$7.00.

PRIMARY METAL

(Cents per lb, unless otherwise noted)

Antimony, American, Laredo, Tex... 33.50
Beryllium aluminum 5% Be, Dollar per lb contained Be $74.75
Beryllium copper, per lb conta'd Be $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $71.50
Bismuth, ton lots .....$ 2.25
Cadmium, del'd .....$ 1.70
Calcium, 99.9%, small lots .....$ 4.55
Chromium, 99.8% metallic basis ...$ 1.31
Cobalt, 97-99% (per lb) ....$2.00 to $2.07
Germanium, per gm, f.o.b. Miami, Okla., refined .....$48.50-$53.50
Gold, U. S. Treas., per troy oz. $35.00
Indium, 99.9% dollars per troy oz...$ 2.25
Iridium, dollars per troy oz....$90 to $100
Lithium, 98% .....$11.00 to $14.00
Magnesium, sticks, 100 to 500 lb... 59.00
Mercury, dollars per 76-lb flask, f.o.b. New York .....$255 to $257
Nickel oxide sinter at Copper Cliff, Ont., contained nickel 71.25
Palladium, dollars per troy oz...$23 to $24
Platinum, dollars per troy oz....$92 to $95
Rhodium .....$120.00 to $125.00
Silver ingots (¢ per troy oz.) 91.375
Thorium, per kg. $43.00
Uranium, normal per kg. $40.00
Vanadium .....$ 3.45
Zirconium sponge $10.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
No. 115 ..... 31.50
No. 120 ..... 30.00
No. 123 ..... 28.50
80-10-10 ingot
No. 305 ..... 35.50
No. 315 ..... 33.50
88-10-2 ingot
No. 210 ..... 43.25
No. 215 ..... 40.00
No. 245 ..... 35.50
Yellow ingot
No. 405 ..... 25.25
Manganese bronze
No. 421 ..... 28.50

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
0.30 copper max. 24.00-25.25
0.60 copper max. 23.75-25.00
Piston alloys (No. 122 type)...23.00-25.00
No. 12 alum (No. 2 grade)...21.00-22.50
108 alloy 21.50-22.50
195 alloy 23.75-25.50
13 alloy (0.60 copper max.)...23.75-25.00
AXS-679 .....21.50-22.50

Steel deoxidizing aluminum, notch bar granulated or shot

Grade 1—95-97½% 22.00-22.75
Grade 2—92-95% 21.00-21.50
Grade 3—90-92% 20.00-20.50
Grade 4—85-90% 18.75-19.50

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	28	27¼
Yellow brass	21⅞	20⅛
Red brass	25	24¼
Comm. bronze	25⅞	25⅛
Mang. bronze	20½	19¾
Yellow brass rod ends	21⅝	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 26
No. 2 copper wire 24¼
Light copper 22
*Refinery brass 23½
Copper bearing material 23

*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 26
No. 2 copper wire 24¼
Light copper 22
No. 1 composition 23
No. 1 comp. turnings 22½
Hvy. yellow brass solids 17
Brass pipe 19
Radiators 18

Aluminum

Mixed old cast ..... 13 —14
Mixed new clips ..... 15 —16
Mixed turnings, dry ..... 14 —15

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire ..... 23 —23½
No. 2 copper wire ..... 21½ —22
Light copper ..... 19¾ —20¼
Auto radiators (unsweated) ..... 15¼ —15½
No. 1 composition ..... 20¾ —21
No. 1 composition turnings ..... 20 —20½
Cocks and faucets ..... 16½ —17
Clean heavy yellow brass ..... 14 —14½
Brass pipe ..... 17 —17½
New soft brass clippings ..... 19 —19½
No. 1 brass rod turnings ..... 16¼ —16½

Aluminum

Alum. pistons and struts ..... 5½ — 6
Aluminum crankcases ..... 10½ —11
1100 (2S) aluminum clippings 13½ —14
Old sheet and utensils ..... 10½ —11
Borings and turnings ..... 6½ — 7
Industrial castings ..... 10½ —11
2024 (24S) clippings ..... 12 —12½

Zinc

New zinc clippings ..... 5 — 5½
Old zinc ..... 3 — 3½
Zinc routings ..... 2½ — 2¾
Old die cast scrap ..... 1¾ — 2

Nickel and Monel

Pure nickel clippings 85-90
Clean nickel turnings 70-75
Nickel anodes 85-90
Nickel rod ends 85-90
New Monel clippings 45-48
Clean Monel turnings 35-40
Old sheet Monel 44-45
Nickel silver clippings, mixed 24
Nickel silver turnings, mixed 18

Lead

Soft scrap lead ..... 11½—12
Battery plates (dry) ..... 6 — 6¼
Batteries, acid free ..... 3¼ — 3½

Miscellaneous

Block tin ..... 75 —76
No. 1 pewter ..... 59 —60
Auto babbitt ..... 39 —40
Mixed common babbitt ..... 12 —12½
Solder joints ..... 17½—18
Siphon tops 43
Small foundry type ..... 14¼—14½
Monotype ..... 14 —14½
Lino. and stereotype ..... 13 —13½
Electrotype ..... 12½—12¾
Hand picked type shells ..... 9½—10
Lino. and stereo. dross ..... 4¾ — 5
Electro. dross ..... 4 — 4¼

STEEL PRICES

(Effective May 14, 1957)

Italics identify producers listed in key at end of table. Base prices, f.o.b., mill in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$107.00 *B3*		5.05 *B3*	7.40 *B3*	5.05 *B3*						
	Buffalo, N. Y.	$74.00 *B3, R3*	$91.50 *B3, R3*	$107.00 *B3, R3*	5.90 *B3*	5.05 *B3*	7.40 *B3*	5.05 *B3*	4.675 *B3, R3*	6.85 *R7*	6.95 *B3*			
	Claymont, Del.													
	Harrison, N. J.													14.55 *C11*
	Conshohocken, Pa.		$96.50 *A2*	$114.00 *A2*					4.725 *A2*	6.90 *A2*	6.95 *A2*			
	New Bedford, Mass.									7.30 *R6*				
	Johnstown, Pa.	$74.00 *B3*	$91.50 *B3*	$107.00 *B3*		5.05 *B3*	7.40 *B3*							
	Boston, Mass.									7.40 *T8*				14.90 *T8*
	New Haven, Conn.									7.30 *D1*				
	Baltimore, Md.									6.85 *T8*				
	Phoenixville, Pa.					5.85 *P2*		5.85 *P2*						
	Sparrows Pt., Md.								4.675 *B3*		6.95 *B3*			
	Bridgeport, Wallingford, Conn.	$79.00 *N8*	$96.50 *N8*	$107.00 *N8*						7.30 *W1* 6.95 *N8*				
	Pawtucket, R. I. Worcester, Mass.									7.48 *A5,N7*				14.90 *N7*
MIDDLE WEST	Alton, Ill.								4.875 *L1*					
	Ashland, Ky.								4.675 *A7*					
	Canton-Massillon, Dover, Ohio		$94.00 *R3*	$107.00 *R3, T5*						6.85 *G4*		10.10 *G4*		14.55 *G4*
	Chicago, Ill. Franklin Park, Ill. Evanston, Ill.	$74.00 *U1, R3*	$91.50 *U1, R3,W8*	$107.00 *U1, R3,W8*	5.90 *U1*	5.00 *U1,W8* 5.00 *P15*	7.35 *U1,Y1* 6.00 *W8*	5.00 *U1*	4.675 *N4* 4.675 *A1*	6.95 *A1,T8* 6.95 *M8*			7.75 *W8, S9*	14.55 *A1, S9,T8*
	Cleveland, Ohio									6.85 *A5,J3*			7.75 *J3*	
	Detroit, Mich.			$107.00 *R5*					4.775 *G3, M2*	6.95 *M2,G3, D2,P11*	7.05 *G3*	10.10 *G3, D2*	7.75 *G3*	
	Anderson, Ind.									6.85 *G4*		10.10 *G4*		
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	$74.00 *U1*	$91.50 *U1*	$107.00 *U1, Y1*	5.90 *I3*	5.00 *U1*	7.35 *U1,I3*	5.25 *I3*	4.675 *U1, I3,Y1*	6.85 *Y1*	6.95 *U1, I3,Y1*	10.20 *Y1*	7.75 *U1, Y1*	
	Sterling, Ill.	$74.00 *N4*				5.00 *N4*			4.775 *N4*					
	Indianapolis, Ind.									7.00 *C5*				
	Newport, Ky.												7.75 *A9*	
	Middletown, Ohio													
	Niles, Warren, Ohio Sharon, Pa.		$91.50 *S1, C10*	$107.00 *S1, C10*					4.675 *S1, R3*	6.85 *T4*	6.95 *S1, R3*	10.00 *S1, R3*	7.75 *S1*	14.55 *S1*
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	$74.00 *U1*	$91.50 *U1, C11*	$107.00 *U1, C11*	5.90 *U1*	5.00 *U1, J3*	7.35 *U1, J3*	5.00 *U1*	4.675 *P6*	5.750 *P6* 6.85 *J3,B4, S7*			7.75 *S9*	14.55 *S9*
	Portsmouth, Ohio													
	Weirton, Wheeling, Follansbee, W. Va.					5.00 *W3*			4.675 *W3*	6.85 *W3,F3*	6.95 *W3*	9.65 *W3*		
	Youngstown, Ohio	$74.00 *R3*	$91.50 *Y1, C10*	$107.00 *Y1*			7.35 *Y1*			6.85 *Y1,C5*	6.95 *U1, Y1*	10.20 *Y1*	7.75 *U1, Y1*	
WEST	Fontana, Cal.	$83.50 *K1*	$101.00 *K1*	$128.00 *K1*		5.75 *K1*	8.10 *K1*	5.90 *K1*	5.525 *K1*	8.70 *K1*				
	Geneva, Utah		$91.50 *C7*			5.00 *C7*	7.35 *C7*							
	Kansas City, Mo.					5.10 *S2*	7.45 *S2*		4.925 *S2*		7.20 *S2*			
	Los Angeles, Torrance, Cal.		$101.00 *B2*	$127.00 *B2*		5.70 *C7, B2*	8.05 *B2*		5.425 *B2, C7*	8.90 *C1*			8.95 *B2*	
	Minnequa, Colo.					5.30 *C6*			5.775 *C6*					
	Portland, Ore.					5.75 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$101.00 *B2*			5.65 *B2*	8.00 *B2*		5.425 *C7,B2*					
	Seattle, Wash.		$105.00 *B2*			5.75 *B2*	8.10 *B2*		5.675 *B2*					
SOUTH	Atlanta, Ga.					5.20 *A8*			4.875 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$74.00 *T2*	$91.50 *T2*			5.00 *T2,R3* 5.00 *C16*	7.35 *T2*		4.675 *T2,R3* 4.975 *C10* 4.675 *C16*		6.95 *T2*			
	Houston, Lone Star, Texas	$80.00 *L3*	$96.50 *S2*	$112.00 *S2*		5.10 *S2*	7.45 *S2*		4.925 *S2*		7.20 *S2*			

STEEL PRICES

(Effective May 14, 1957)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE
		Hot-rolled 18 ga. & hvyr.	Cold-rolled	Galvanized	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled 19 ga.		Cokes* 1.25-lb. base box	Electro* 0.25-lb. base box	Holloware Enameling 29 ga.
EAST	Bethlehem, Pa.													
	Buffalo, N. Y.	4.675 *B3*	5.75 *B3*				6.90 *B3*	8.525 *B3*			5.80 *W6*			
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.	4.725 *A2*	5.80 *A2*				6.95 *A2*							
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.										5.80 *B3*			
	Fairless, Pa.	4.725 *U1*	5.80 *U1*				6.95 *U1*	8.575 *U1*				$10.15 *U1*	$8.85 *U1*	
	New Haven, Conn.													
	Phoenixville, Pa.													
	Sparrows Pt., Md.	4.675 *B3*	5.75 *B3*	6.30 *B3*			6.90 *B3*	8.575 *B3*	9.275 *B3*		5.90 *B3*	$10.15 *B3*	$8.85 *B3*	
	Worcester, Mass.										6.10 *A5*			
	Trenton, N. J.													
MIDDLE WEST	Alton, Ill.										6.00 *L1*			
	Ashland, Ky.	4.675 *A7*		6.30 *A7*	6.325 *A7*									
	Canton-Massillon, Dover, Ohio			6.30 *R3,R1*										
	Chicago, Joliet, Ill.	4.675 *W8, A1*					6.90 *U1*			5.80 *K2*	5.80 *A5,R3, N4,W8, K2*			
	Sterling, Ill.										5.90 *N4, K2*			
	Cleveland, Ohio	4.675 *J3, R3*	5.75 *J3, R3*		6.325 *R3*		6.90 *R3*	8.525 *R3, J3*			5.80 *A5*			
	Detroit, Mich.	4.775 *G3, M2*	5.85 *G3* 5.75 *M2*				7.00 *G2*	8.625 *G3*						
	Newport, Ky.	4.675 *A9*	5.75 *A9*											
	Gary, Ind. Harbor, Indiana	4.675 *U1, I3,Y1*	5.75 *U1, I3,Y1*	6.30 *U1, I3*	6.325 *U1, I3,Y1*	6.70 *U1*	6.90 *U1, Y1,I3*	8.525 *U1, Y1*			5.80 *Y1*	$10.05 *U1, Y1*	$8.75 *I3, U1,Y1*	7.50 *U1, Y1*
	Granite City, Ill.	4.875 *G2*	5.95 *G2*	6.50 *G2*	6.525 *G2*								$8.85 *G2*	7.60 *G2*
	Kokomo, Ind.			6.40 *C9*							5.90 *C9*			
	Mansfield, Ohio		5.75 *E2*			6.70 *E2*								
	Middletown, Ohio		5.75 *A7*	6.30 *A7*	6.325 *A7*	6.70 *A7*								
	Niles, Warren, Ohio Sharon, Pa.	4.675 *S1, R3,N3*	5.75 *R3*	6.30 *R3*	6.325 *N3*	6.70 *N3*	6.90 *S1, R3*	8.525 *S1, R3*					$8.75 *R3*	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	4.675 *U1, J3,P6*	5.75 *U1, J3,P6*	6.30 *U1, J3*	6.325 *U1*		6.90 *U1, J3,R3*	8.525 *U1, J3*	9.275 *U1*		5.80 *A5, P6,J3*	$10.05 *J3, U1*	$8.75 *U1, J3*	7.50 *U1, J3*
	Portsmouth, Ohio	4.675 *P7*	5.75 *P7*								5.80 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	4.675 *W3, W5*	5.75 *W3, W5,F3*	6.30 *W3, W5*		6.70 *W3, W5*	6.90 *W3*	8.525 *W3*				$10.05 *W5, W3*	$8.75 *W5, W3*	7.50 *W5*
	Youngstown, Ohio	4.675 *U1, Y1*	5.75 *Y1*		6.325 *Y1*		6.90 *Y1*	8.525 *Y1*			5.80 *Y1*			
WEST	Fontana, Cal.	5.525 *K1*	7.00 *K1*				7.75 *K1*	9.775 *K1*				$10.80 *K1*	$9.50 *K1*	
	Geneva, Utah	4.775 *C7*												
	Kansas City, Mo.										6.05 *S2*			
	Los Angeles, Torrance, Cal.										6.60 *B2*			
	Minnequa, Colo.										6.05 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.375 *C7*	6.70 *C7*	7.05 *C7*							6.60 *C7*	$10.80 *C7*	$9.50 *C7*	
	Seattle, Wash.													
SOUTH	Atlanta, Ga.													
	Fairfield, Ala. Alabama City, Ala.	4.675 *T2, R3*	.575 *T2*	6.30 *T2, R3*							5.80 *T2,R3*	$10.15 *T2*	$8.85 *T2*	
	Houston, Tex.										6.05 *S2*			

† Special coated mfg. terne deduct 50¢ from 1.25-lb. coke base box price. Can-making quality blackplate 55 to 128 lb. deduct $2.20 from 1.25-lb. coke base box.

* COKES: 1.50-lb. add 25¢.

ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb. 0.25 lb. add 65¢.

IRON AGE

STEEL PRICES

(Effective May 11, 1957)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				6.125 *B3*	8.325 *B3*	7.40 *B3*					
	Buffalo, N. Y.	5.075 *B5,R3*	5.075 *B3,R3*	6.90 *B5*	6.125 *B3,R3*	8.325 *B5,B3*	7.40 *B3*	4.85 *B3*				7.20 *W6*
	Claymont, Del.							5.70 *C4*		6.85 *C4*	7.55 *C4*	
	Coatesville, Pa.							5.25 *L4*		6.85 *L4*	7.55 *L4*	
	Conshohocken, Pa.							4.95 *A2*	5.925 *A2*	6.85 *A2*	7.25 *A2*	
	Harrisburg, Pa.							5.80 *P2*	6.275 *P2*			
	Hartford, Conn.			7.35 *R3*		8.625 *R3*	7.40 *B3*					
	Johnstown, Pa.	5.075 *B3*	5.075 *B3*		6.125 *B3*			4.85 *B3*		6.85 *B3*	7.25 *B3*	7.20 *B3*
	Fairless, Pa.	5.225 *U1*	5.225 *U1*		6.275 *U1*							
	Newark, N. J.			7.30 *W10*		8.50 *W10*						
	Camden, N. J.			7.30 *P10*		8.50 *P10*						
	Bridgeport, Conn. Putnam, Conn.	5.30 *N8*	5.30 *N8*	7.20 *N8* 7.40 *W10*	6.20 *N8*	8.475 *N8*	7.50 *N8*					
	Sparrows Pt., Md.		5.075 *B3*					4.85 *B3*		6.85 *B3*	6.85 *B3*	7.30 *B3*
	Palmer, Worcester, Readville, Mass. Milton, Mass.	5.225 *M7*	5.225 *M7*	7.40 *B5,C14*		8.625 *A5* 8.625 *B5*						7.50 *A5,W6* 9.025 *T8*
	Spring City, Pa.			7.30 *K4*		8.50 *K4*						
MIDDLE WEST	Alton, Ill.	5.275 *L1*										7.40 *L1*
	Ashland, Newport, Ky.							4.85 *A7,A9*		6.85 *A9*		
	Canton, Massillon, Ohio			6.85 *R3,R2*	6.125 *R3,T5*	8.325 *R3,R2, T5*						
	Chicago, Joliet, Ill.	5.075 *U1,R3, W8,N4* 5.075 *P13*	5.075 *U1,R3, N4* 5.075 *P13*	6.85 *A5,B5, W10,L2 W8,N9*	6.125 *U1,R3, W8*	8.325 *A5,B5, W8,L2,N9, W10*	5.875 *W8* 7.425 *U1*	4.85 *U1,I3, W8,A1*	5.925 *U1*	6.85 *U1,W8*	7.25 *U1*	7.20 *A5,K2 R3,N4,W7*
	Cleveland, Ohio	5.075 *R3*	5.075 *R3*	6.85 *A5,C13*		8.325 *A5,C13*	7.425 *R3*	4.95 *J3,R3*	5.925 *J3*		7.25 *J3,R3*	7.20 *A5, C13*
	Detroit, Mich.	5.175 *G3*	5.425 *G3*	7.05 *B5,P8* 7.10 *P3* 6.85 *R5*	6.225 *G3* 6.125 *R5*	8.525 *B5,P3, P8* 8.325 *R5*	7.525 *G3*	4.95 *G3*		6.90 *G3*		
	Duluth Minn.											7.20 *A5*
	Gary, Ind. Harbor, Crawfordsville	5.075 *U1,I3, Y1*	5.075 *U1,I3, Y1*	6.85 *R3,M5*	6.125 *U1,I3, Y1*	8.325 *R3,M4*	7.425 *U1,I3, Y1*	4.85 *U1,I3, Y1*	5.925 *I3*	6.85 *U1,Y1*	7.25 *U1,Y1*	7.30 *M4*
	Granite City, Ill.							5.05 *G2*				
	Kokomo, Ind.											7.30 *C9*
	Sterling, Ill.	5.175 *N4*	5.175 *N4*					4.85 *N4*				7.30 *K2*
	Niles, Warren, Ohio Sharon, Pa.			6.85 *C10*	6.125 *C10,S1*	8.325 *C10*	7.425 *S1*	4.85 *S1,R3*		6.85 *S1*	7.25 *S1,R3*	
	Pittsburgh, Pa. Midland, Pa.	5.075 *U1, C11,J3*	5.075 *U1,J3*	6.85 *A5,C8, J3,R3,S9, B4,W10,C11*	6.125 *U1, C11,J3*	8.325 *A5,R3, S9,C8,W10, C11*	7.425 *U1,J3*	4.85 *U1,J3*	5.925 *U1*	6.85 *U1,J3*	7.25 *U1,J3*	7.20 *A5,J3, P6*
	Portsmouth, Ohio											7.20 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							4.85 *W5*				
	Youngstown, Ohio	5.075 *U1, Y1,R3*	5.075 *U1, Y1,R3*	6.85 *U1,Y1, F2*	6.125 *U1,Y1*	8.325 *Y1,F2*	7.425 *U1,Y1*	4.85 *U1,Y1, R3*		6.85 *Y1*	7.25 *Y1* 7.25 *U1*	7.20 *Y1*
WEST	Emeryville, Cal.	5.825 *J5*	5.825 *J5*									
	Fontana, Cal.	5.775 *K1*	5.775 *K1*		7.175 *K1*		8.125 *K1*	5.60 *K1*		7.60 *K1*	8.00 *K1*	
	Geneva, Utah							4.85 *C7*			7.25 *C7*	
	Kansas City, Mo.	5.325 *S2*	5.325 *S2*		6.375 *S2*		7.675 *S2*					7.45 *S2*
	Los Angeles, Torrance, Cal.	5.775 *C7,B2*	5.775 *C7,B2*	8.30 *R3,P14*	7.175 *B2*	10.20 *P14*	8.125 *B2*					8.15 *B2*
	Minnequa, Colo.	5.525 *C6*	5.525 *C6*					5.70 *C6*				7.45 *C6*
	Portland, Ore.	5.825 *O2*	5.825 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	5.775 *C7* 5.825 *B2* 6.025 *P9*	5.775 *C7* 5.825 *B2* 6.025 *P9*				8.175 *B2*					8.15 *C7,C6*
	Seattle, Wash.	5.825 *B2, N6*	5.825 *B2*				8.175 *B2*	5.75 *B2*		7.75 *B2*	8.15 *B2*	
SOUTH	Atlanta, Ga.	5.275 *A8*	5.275 *A8*									7.40 *A8*
	Fairfield, Ala. City, Birmingham, Ala.	5.075 *T2,R3* 5.075 *C16*	5.075 *T2,R3* 5.075 *C16*	7.45 *C16*			7.425 *T2*	4.85 *T2,R3*			7.25 *T2*	7.20 *T2,R3*
	Houston, Ft. Worth, Lone Star, Tex.	5.325 *S2*	5.325 *S2*		6.375 *S2*		7.675 *S2*	4.95 *S2* 5.20 *L3*		6.95 *S2*	7.35 *S2*	7.45 *S2*

† Merchant Quality—Specialty Quality .35¢ higher.

STEEL PRICES (Effective May 14, 1957)

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland.
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metals Products Co., Youngstown, O.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C17 Chester Blast Furnace, Inc., Chester, Pa.

D1 Detroit Steel Corp., Detroit
D2 Dearborn Div., Sharon Steel Corp.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.
G2 Granite City Steel Co., Granite City, Ill.
G5 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
H1 Hanna Furnace Corp., Detroit
I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Div., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Evanston, Ill.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Northeastern Steel Corp., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.
Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½ In.		3 In.		3½-4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	7.25	+8.00	10.25	+4.00	13.75	0.50	16.25	1.25	16.75	2.25	17.25	2.75	18.75	2.50								
Youngstown *R3*	9.25	+10.00	12.25	+6.00	15.75	+1.50	18.25	0.25	18.75	1.25	19.25	1.75	20.75	2.50								
Fontana *K1*	+3.75	+19.00	+0.75	+15.00	2.75	+10.50	5.25	+9.75	5.75	+8.75	6.25	+8.25	7.75	+8.50								
Pittsburgh *J3*	9.25	+6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.75	5.25	5.25	+20.25	1.25	+16.50	3.75	+13.00	5.25	+11.50
Alton, Ill. *L1*	7.25	+8.00	10.25	+4.00	13.75	0.50	16.25	1.25	16.75	2.25	17.25	2.75	18.75	2.50								
Sharon *M5*	9.25	+10.00	12.25	+2.00	15.75	+1.50	18.25	0.25	18.75	1.25	19.25	1.75	20.75	2.50								
Fairless *N2*	7.25	+8.00	10.25	+4.00	13.75	0.50	16.25	1.25	16.75	2.25	17.25	2.75	18.75	2.50								
Pittsburgh *N1*	9.25	+6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.75	5.25	5.25	+20.25	1.25	+16.50	3.75	+13.00	5.25	+11.50
Wheeling *W5*	9.25	+6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.75	5.25								
Wheatland *W4*	9.25	+6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.75	5.25								
Youngstown *Y1*	9.25	+6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.75	5.25	5.25	+20.25	1.25	+16.50	3.75	+13.00	5.25	+11.50
Indiana Harbor *Y1*	8.25	+9.00	13.25	+2.00	14.75	1.50	17.25	2.25	17.75	3.25	18.25	3.75	19.75	4.25								
Lorain *N2*	9.25	+6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.75	5.25	5.25	+20.25	1.25	+16.50	3.75	+13.00	5.25	+11.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	11.75	+2.00	15.75	2.00	18.75	6.50	19.25	5.25	19.75	6.25	20.25	6.75	20.75	5.50								
Youngstown *R3*	13.75	+4.00	17.75	list	20.75	4.50	21.25	4.25	21.75	5.25	22.25	5.75	22.75	5.50								
Fairless *N2*	11.75	+2.00	15.75	2.00	18.75	6.50	19.25	5.25	19.75	6.25	20.25	6.75	20.75	5.50								
Fontana *K1*	0.75		4.75		7.75		8.25		8.75		9.25		9.75									
Pittsburgh *J3*	13.75	+2.00	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50	3.75	+17.75	3.75	+12.00	6.25	+10.50	11.25	+5.50
Alton, Ill. *L1*	11.75	+2.00	15.75	2.00	18.75	6.50	19.25	5.25	19.75	6.25	20.25	6.75	20.75	5.50								
Sharon *M5*	13.75	+4.00	17.75	list	20.75	4.50	21.25	4.25	21.75	5.25	22.25	5.75	22.75	5.50								
Pittsburgh *N1*	13.75	+2.00	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50	3.75	+17.75	3.75	+12.00	6.25	+10.50	11.25	+5.50
Wheeling *W5*	13.75	+2.00	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50								
Wheatland *W4*	13.75	+2.00	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50								
Youngstown *Y1*	13.75	+2.00	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50	3.75	+17.75	3.75	+12.00	6.25	+10.50	11.25	+5.50
Indiana Harbor *Y1*	12.75	+1.00	16.75	3.00	19.75	7.50	20.25	6.25	20.75	7.25	21.25	7.75	21.75	6.50								
Lorain *N2*	13.75	+2.00	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50	3.75	+17.75	3.75	+12.00	6.25	+10.50	11.25	+5.50

Threads only, buttweld and seamless 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in. 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 11½¢ per lb.

TOOL STEEL

f.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.68	T-1
18	4	2	—	5	2.385	T-4
18	4	2	—	—	1.185	T-2
1.5	4	1.5	8	—	1.04	M-1
6	4	3	6	—	1.43	M-3
6	4	2	5	—	1.185	M-2

High-carbon chromium	.83 D-3, D-5
Oil hardened manganese	.45 O-2
Special carbon	.41 W-1
Extra carbon	.345 W-1
Regular carbon	.29 W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (A5, J2, L4) 10 pct	Plate (A5, J2, L4) 15 pct	Plate (A5, J2, L4) 20 pct	Sheet (I2) 20 pct
Stainless Type	302				35.50
	304	36.20	40.30	44.50	37.75
	316	41.60	45.90	50.15	55.50
	321	37.95	42.10	46.40	41.75
	347	41.25	46.45	51.70	54.25
	405	29.20	33.15	37.05	
	410, 430	28.70	32.65	36.55	

CR Strip (SS) Copper, 10 pct, 2 sides, 39.55; 1 side, 33.00.

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Cold-Reduced (Coiled or Cut Length) Fully Processed
Field	9.80	9.20	
Armature	10.35	10.35	10.85
Elect.	11.00	11.025	11.525
Motor	12.05	12.075	12.575
Dynamo	13.05	13.05	13.55
Trans. 72	14.05	14.05	14.55
Trans. 65	14.60		
Grain Oriented			
Trans. 58	15.10	Trans. 80	18.50
Trans. 52	16.15	Trans. 73	19.00

Producing points: Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*N5*); Niles, O. (*N3*); Vandergrift (*U1*); Warren, O. (*R3*) (20¢ higher, HR); Zanesville, Butler (*A7*).

LAKE SUPERIOR ORES

51.50% Fe natural content, delivered lower Lake ports. Prices for 1957 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard Q Coated Nails Col	Woven Wire Fence Col	"U" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Annld ¢/lb.	Merch. Wire Galv ¢/lb.
Alabama City *R3*	167	181		195	187	8.10	8.50
Aliquippa, Pa. *J3****	164	179			181	8.20	8.875
Atlanta *A8***	166	182		192	190	8.05	8.65
Bartonville *K2***	166	182		198	190	8.30	9.06
Buffalo *W6*						8.20	8.75
Chicago, Ill. *N4***	164	180	167	196	188	8.35	9.10
Cleveland *A6*	173					8.20	8.75
Cleveland *A5*						8.20	
Crawfordsville *M4***	166	182		198	190	8.30	9.05
Donora, Pa. *A5*	164	176		196	184	8.20	8.75
Duluth *A5*	164	176	167	196	184	8.20	8.75
Fairfield, Ala. *T2*	164	176		196	184	8.20	8.75
Galveston *D4*	169‡						
Houston *S2*	169	181		195	189	8.45	9.00
Johnstown, Pa. *B3***	164	180	167		188	8.20	8.90
Joliet, Ill. *A5*	164	176		196	184	8.20	8.75
Kokomo, Ind. *C9**	166	178		198	186	8.30	8.85
Los Angeles *B2***						9.15	9.90
Kansas City *S2**	169	181		195	189	8.45	9.00
Minnequa *C6†*	169	181	172	201	189	8.45	9.00
Monessen *P6*	167	185			191	8.10	8.10
Palmer, Mass. *W6*						8.50	9.05
Pittsburg, Cal. *C7*	183	199		220	204	9.15	9.70
Rankin, Pa. *A5*	164	176			184	8.20	8.75
So. Chicago *R3*	167	181		195	187	8.10	8.50
S. San Francisco *C6†*				220		9.15	9.70
Sparrows Pt. *B3****	166			198	190	8.30	9.00
Struthers, O. *Y1**						8.20	8.85
Worcester *A5*	170					8.50	9.05
Williamsport, Pa. *S5*			175				

* Zinc less than 10¢. † Plus zinc extras.
** 11-12¢ zinc. ‡ Wholesalers only.
*** 10¢ zinc.

WAREHOUSES

Metropolitan Price, dollars per 100 lb.

Class	City Delivery‡ Charge	Sheets: Hot-Rolled (18 ga. & bar)	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)††	Strip: Hot-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled (merchant)	Bars: Hot-Rolled (special quality)	Bars: Cold-Finished	Alloy Bars: Hot-Rolled 4615 As rolled	Alloy Bars: Hot-Rolled 4140 Annealed	Alloy Bars: Cold-Drawn 4615 As rolled	Alloy Bars: Cold-Drawn 4140 Annealed
Atlanta		8.17	9.37	9.83	8.21	8.55	8.59	8.45	.....	10.23	.....	.....	.....	.....
Baltimore	$.10	7.98	9.08	9.31	8.46	8.36	8.85	8.53	.....	9.13	14.99	14.44	18.39	18.09
Birmingham	.15	7.80	9.00	9.52	7.82	8.16	8.20	8.07	8.44	10.04-10.12	.....	.....	.....	.....
Boston	.10	8.94	9.98	11.16	8.99	9.28	9.20	9.17	9.57	.....	15.79	14.79	19.14	18.39
Buffalo	.15	8.00	9.15	10.90	8.20	8.65	8.65	8.40	8.85	8.85	15.65	14.65	19.01	18.25
Chicago	.15	7.95	9.15	9.80	7.97	8.31	8.35	8.22	8.50	8.50	15.30	14.30	18.65	17.90
Cincinnati	.15	8.09	9.20	9.90	8.29	8.67	8.89	8.53	8.87	8.99	15.61	14.61	18.96	18.21
Cleveland	.15	7.93	9.13	9.75	8.07	8.54	8.72	8.31	8.67	8.75	15.39	14.39	18.74	17.99
Denver		9.70	11.30	12.49	9.80	9.70	9.80	9.95	.....	10.65	.....	.....	.....	17.60
Detroit	.15	8.18	9.40	10.20	8.32	8.66	8.89	8.52	8.86	8.85	15.46	14.56	18.81	18.16
Houston		8.80	9.75	.....	7.75	8.80	8.00	8.05	.....	10.65	15.50	.....	19.30	19.05
Kansas City	.20	8.52	9.72	10.07	8.60	8.83	8.87	8.73	.....	9.42	15.32	14.77	18.72	18.42
Los Angeles	.10	9.20	10.90	11.35	9.25	9.75	9.25	9.10	9.30	12.20	16.45	15.60	20.30	19.70
Memphis	.15	8.02	9.22	.....	8.12	8.35	8.39	8.25	.....	9.85	.....	.....	.....	.....
Milwaukee	.15	8.08	9.28	9.93	8.10	8.44	8.56	8.35	8.71	8.72	15.43	14.43	18.78	18.03
New York	.10	8.55	9.76	10.33	9.00	9.11	9.01	9.11	9.48	.....	15.02	14.69	18.42	18.29
Norfolk	.20	8.00	.....	.....	8.40	8.35	8.70	8.45	.....	10.70	.....	.....	.....	.....
Philadelphia	.10	8.25	9.17	10.39	8.92	8.78	8.80	8.81	9.18	9.41	15.61	14.61	18.96	18.21
Pittsburgh	.15	7.93	9.14	10.20	8.07	8.31	8.35	8.22	8.59	8.75	15.30	14.30	18.65	17.90
Portland		9.20	11.20	11.60	11.05	9.00	9.35	9.35	.....	13.80	16.70	16.10	20.40	20.25
San Francisco	.10	9.05	10.40	10.90	9.05	9.30	9.15	9.15	9.90	12.40	16.45	15.60	20.30	19.70
Seattle		9.55	10.70	11.65	9.55	9.30	9.35	9.50	9.85	13.40	16.55	15.85	19.50	19.45
Spokane	.15	9.70	10.85	11.80	9.70	9.45	9.50	9.65	10.00	13.55	.....	16.75	.....	20.35
St. Louis	.15	8.29	9.49	10.16	8.34	8.67	8.82	8.58	9.11	9.11	15.66	14.66	19.01	18.26
St. Paul	.15	8.39	9.59	10.31	8.43	8.90	8.94	8.53	.....	9.21	.....	14.62	.....	18.27

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.
† 16 gage. †† 13½¢ zinc. ‡ Deduct for country delivery.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Baltimore, Md. *T8*	9.20	10.40	12.60	15.60	18.55
Bristol, Conn. *W12*		10.40	12.60	15.60	18.55
Boston *T8*	9.20	10.40	12.60	15.60	18.55
Buffalo, N. Y. *R7*	8.65	10.10	12.30	15.30	18.25
Carnegie, Pa. *S9*	8.65	10.10	12.30	15.30	
Cleveland *A5*	8.65	10.10	12.30	15.30	18.25
Detroit *D1*	8.75	10.20	12.40	15.40	.....
Detroit *D2*	8.75	10.20	12.40	.....	.....
Dover, O. *G4*	8.65	10.10	12.30	15.30	18.25
Evanston, Ill. *M8*	8.65	10.10	12.30	.....	.....
Franklin Park, Ill. *T8*	8.75	10.10	12.30	15.30	18.25
Harrison, N. J. *C11*	.....	.....	12.60	15.60	18.55
Indianapolis *C5*	8.80	10.25	12.30	15.30	18.25
Los Angeles	10.85	12.30	14.50	.....	.....
New Castle, Pa. *B4*	8.65	10.10	12.30	15.30	.....
New Haven, Conn. *D1*	9.10	10.40	12.60	15.60	.....
Pawtucket, R. I. *N7*	9.20	10.40	12.60	15.60	18.55
Pittsburgh *S2*	8.65	10.10	12.30	15.30	18.25
Riverdale, Ill. *A1*	8.75	10.10	12.30	15.30	18.25
Sharon, Pa. *S1*	8.65	10.10	12.30	15.30	18.25
Trenton *R4*	11.05	10.40	12.60	15.60	18.55
Wallingford *W1*	9.10	10.40	12.60	15.60	18.45
Warren, Ohio *T4*	8.65	10.10	12.30	15.30	18.25
Worcester, Mass. *A5*	9.20	10.40	12.60	15.60	18.55
Youngstown *C5*	8.65	10.10	12.30	15.30	18.25

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size BWG.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	36.34	42.56	33.21	.....
	2½	12	48.94	57.31	44.73	.....
	3	12	56.51	66.18	51.66	.....
	3½	11	65.97	77.25	60.30	.....
	4	10	87.61	102.59	80.07	.....
National Tube	2	13	36.34	42.56	33.21	.....
	2½	12	48.94	57.31	44.73	.....
	3	12	56.51	66.18	51.66	.....
	3½	11	65.97	77.25	60.30	.....
	4	10	87.61	102.59	80.07	.....
Pittsburgh Steel	2	13	36.34	42.56	.....	.....
	2½	12	48.94	57.31	.....	.....
	3	12	56.51	66.18	.....	.....
	3½	11	65.97	77.25	.....	.....
	4	10	87.61	102.59	.....	.....

(Effective May 14, 1957)

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Untreated
Bessemer *Ul*	5.275	6.25	6.60				
Cleveland							13.85
So. Chicago *R3*				9.225			
Ensley *T2*	5.275	6.25					
Fairfield *T2*		6.25		9.225		6.275	
Gary *Ul*	5.275					6.275	
Huntington *C6*		6.25					
Ind. Harbor *I3*	5.275		6.60	9.225		6.275	
Ind. Harbor *Y1*				9.225			
Johnstown *B3*		6.25					
Joliet *Ul*			6.60				
Kansas City *S2*				9.225			13.85
Lackawanna *B3*	5.275	6.25	6.60			6.275	
Lebanon *B3*							13.85
Minnequa *C6*	5.275	6.75	6.60	9.225		6.275	13.85
Pittsburgh *P5*							13.85
Pittsburgh *J3*				9.225			
Seattle *B2*				9.725		6.425	13.85
Steelton *B3*	5.275		6.60			6.275	13.85
Struthers *Y1*				9.225			
Torrance *C7*						6.425	
Williamsport *S5*		6.15					
Youngstown *R3*				9.225			

COKE

Net-Ton

Furnace, beehive (f.o.b. oven) Connellsville, Pa. ..... $15.00 to $15.75
Foundry, beehive (f.o.b. oven) ..... $17.50 to $19.00

Foundry oven coke

Buffalo, del'd	$31.75
Detroit, f.o.b.	30.50
New England, del'd	31.55
Kearney, N. J., f.o.b.	29.75
Philadelphia, f.o.b.	29.50
Swedeland, Pa., f.o.b.	29.50
Painesville, Ohio, f.o.b.	30.50
Erie, Pa., f.o.b.	30.50
Cleveland, del'd	32.65
Cincinnati, del'd	31.84
St. Paul, f.o.b.	29.75
St. Louis, f.o.b.	31.50
Birmingham, f.o.b.	28.85
Milwaukee, f.o.b.	30.50
Neville, Is., Pa.	29.25

ELECTRODES

Cents per lb, f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE			CARBON*		
Diam. (In.)	Length (In.)	Price	Diam. (In.)	Length (In.)	Price
24	84	24.75	40	100,110	10.70
20	72	24.00	35	110	10.70
16 to 18	72	24.50	30	110	10.85
14	72	25.00	24	72 to 84	11.25
12	72	25.50	20	90	11.00
10	60	26.50	17	72	11.40
10	48	27.00	14	72	11.85
7	60	26.75	12	60	12.95
6	60	30.00	10	60	13.00
4	40	33.25	8	60	13.30
3	40	35.25			
2½	30	37.25			
2	24	57.75			

* Prices shown cover carbon nipples.

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper

Cast elliptical, 18 in. or longer, 5000 lb lots	47.92
Electrodeposited	39.25
Brass, 80-20, ball anodes, 2000 lb or more	50.00
Zinc, ball anodes, 2000 lb lots	21.25
(for elliptical add 2¢ per lb)	
Nickel, 99 pct plus, rolled carbon, 5000 lb	1.0225
(Rolled depolarized add 3¢ per lb)	
Cadmium	1.70
Tin, ball anodes and elliptical $1.97 per in.	

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	74.80
Copper sulphate, 100 lb bags, per cwt.	24.35
Nickel salts, single, 100 lb bags	40.50
Nickel chloride, freight allowed, 300 lb	45.50
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums	23.05
(Philadelphia price 23.30)	
Zinc cyanide, 100 lb	59.00
Potassium cyanide, 100 lb drum N. Y.	48.00
Chromic acid, flake type, 100,000 lb or more	31.00

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Pct Discounts

Machine and Carriage Bolts	Full Container Price	30 Containers	20,000 Lb.	40,000 Lb.
½" and smaller x 6" and shorter	52½	56½	58½	59½
⅝" thru 1" x longer than 6"	43½	47½	50	51½
Rolled thread carriage bolts ½ in. & smaller x 6 in. and shorter	52½	56½	58½	59½
Lag, all diam. x 6" & shorter	52½	56	58	59
Lag, all diam. longer than 6 in.	44½	48	50	51
Plow bolts, ½" and smaller x 6" and shorter	52	55½	57	58

(Add 25 pct for broken case quantities)

Nuts, Hex, HP reg. & hvy.

	Full Case or Keg Price
¾ in. or smaller	61½
⅞ in. to 1 in. inclusive	57½
1⅛ in. to 1½ in. inclusive	62½
1⅝ in. and larger	56

C. P. Hex reg. & hvy.

¾ in. and smaller	61½
⅞ in. to 1½ in. inclusive	57½
1⅝ in. and larger	56

Hot Galv. Nuts (All Types)

¾ in. and smaller	48

Semi-finished Hex Nuts

¾ in. or smaller	61½
⅞ in. to 1½ in. inclusive	57½
1⅝ in. and larger	56

(Add 25 pct for broken case or keg quantities)

Finished

1 in. and smaller	64

Rivets

Base per 100 lb

½ in. and larger	$11.50

Pct Off List

7/16 in. and smaller	23

Cap Screws

	Discount (Packages) Bright	Treated	H. C. Heat
New std. hex head, packaged			
⅝" diam. and smaller x 6" and shorter	44		31
¾", ⅞" and 1" diam. x 6" and shorter	27		9
⅝" diam. and smaller x longer than 6"	14		+ 6
¾", ⅞" and 1" diam. & longer than 6"	½		+24

	C-1018 Steel Full-Finished Cartons	Bulk
¼" through ⅝" dia. x 6" and shorter	44	61
¾" through 1" dia. x 6" and shorter	27	49

Minimum quantity—¼" through ⅝" diam., 15,000 pieces; 1/16" through ⅝" diam., 5,000 pieces; ¾" through 1" diam., 2,000 pieces.

Machine Screws & Stove Bolts

	Quantity	Discount Mach. Screws	Stove Bolts
Plain Finish Cartons		19	32
Bulk			
To ¼" diam. incl.	25,000-200,000	9	54
5/16 to ½" diam. incl.	15,000-100,000	9	54
All diam. over 3" long	5,000-100,000	—	54

Machine Screw & Stove Bolt Nuts

	Quantity	Discount Hex	Square
In cartons		16	19
In Bulk			
⅜" diam. & smaller	15,000-100,000	7	9

CAST IRON WATER PIPE INDEX

Birmingham	119.0
New York	131.7
Chicago	134.1
San Francisco-L. A.	141.8

Dec. 1955 value, Class B or heavier 6 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

REFRACTORIES

Fire Clay Brick

Carloads per 1000

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5.00)	$135.00
No. 1 Ohio	120.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	120.00
No. 2 Ohio	103.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $2.00)	21.50

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$156.00
Childs, Hays, Pa.	155.00
Chicago District	160.00
Western Utah	175.00
California	180.00
Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville	157.00-160.00
Silica cement, net ton, bulk, Latrobe	28.50
Silica cement, net ton, bulk, Chicago	25.50
Silica cement, net ton, bulk, Ensley, Ala.	26.50
Silica cement, net ton, bulk, Mt. Union	24.50
Silica cement, net ton, bulk, Utah and Calif.	37.00

Chrome Brick

Per net ton

Standard chemically bonded, Balt.	$105.00
Standards chemically bonded, Curtiner, Calif.	115.00
Burned, Balt.	99.00

Magnesite Brick

Standard, Baltimore	$131.00
Chemically bonded, Baltimore	116.00

Grain Magnesite

St. ⅝ to ½-in. grains

Domestic, f.o.b. Baltimore in bulk	$73.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev. in bulk	46.00
in sacks	52.00-54.00

Dead Burned Dolomite

Per net ton

F.o.b. bulk, producing points in: Pa., W. Va., Ohio	$16.00
Midwest	16.35
Missouri Valley	15.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh

Swedish sponge iron, del. East of Miss. River, ocean bags, 23,000 lb. and over	10.5¢
F.O.B. Riverton or Camden, New Jersey, West of Miss. River	9.5¢
Domestic sponge iron, 98+% Fe, 23,000 lb. and over del'd. East of Miss. River	10.5¢
F.O.B. Riverton, New Jersey, West of Miss. River	9.5¢
Canadian sponge iron, del'd in East, carloads	9.5¢
Electrolytic iron, annealed, imported 99.5+% Fe	27.5¢
domestic 99.5+% Fe	36.5¢
Electrolytic iron, unannealed minus 325 mesh, 99+% Fe	57.0¢
Electrolytic iron melting stock, 99.84% pure	22.0¢
Carbonyl iron size 5 to 10 micron, 98%, 99.8+% Fe	86.0¢ to $1.55
Aluminum, freight allowed	38.00¢
Brass, 10 ton lots	37.50¢ to 50.00¢
Copper, electrolytic	49.75¢
Copper, reduced	49.75¢
Cadmium, 100-199 lb, 95¢ plus metal value	
Chromium, electrolytic, 99.85% min. Fe .03 max. Del'd	$5.00
Lead	8.90¢ plus metal value
Manganese f.o.b. Exton, Pa.	46.0¢
Molybdenum, 99%	$3.60 to $3.95
Nickel, unannealed	$1.00
Nickel, annealed	$1.06
Nickel, spherical, unannealed #80	$1.13
Silicon	43.50¢
Solder powder	7.0¢ to 9.0¢ plus met. value
Stainless steel, 302	99.0¢
Stainless steel, 316	$1.32
Tin	14.00¢ plus metal value
Tungsten, 99% (65 mesh)	$4.00 (nominal)
Zinc, 10 ton lots	18.75¢ to 32.50¢

FERROALLOY PRICES

(Effective May 14, 1957)

Ferrochrome

Contract prices, cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr, .30-1.00% max. Si.

0.02% C	41.50	0.20% C	38.50
0.03% C	41.00	0.50% C	38.25
0.06% C	39.50	1.00% C	37.50
0.10% C	39.00	1.50% C	37.36
0.15% C	38.75	2.00% C	37.25

4.00-4.50% C, 67.70% Cr, 1-2% Si.. 27.75
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si 27.75
0.025% C (Simplex) 34.75
0.10% C, 50-52% Cr, 2% max Si .. 35.50
3.50% max. C, 50-55% Cr, 3-6% Si 24.00
3.50% C, 50-55% Cr, 3% max. Si... 24.00

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max 0.10% C price schedule. Add 5¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C	$1.31
0.50% max. C	1.31
9 to 11% C, 88-91% Cr, 0.75% Fe	1.40

Electrolytic Chromium Metal

Contract prices per lb of metal 2" x D plate (⅛" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads	$1.29
Ton lots	1.31
Less ton lots	1.33

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-45%, C 0.05% max.) Contract price, carloads, delivered, lump, 8-in. x down, per lb of Cr, packed.

Carloads	44.65
Ton lots	48.95
Less ton lots	51.45

Calcium-Silicon

Contract price per lb of alloy, lump, delivered, packed.
30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads	25.65
Ton lots	27.95
Less ton lots	29.45

Calcium-Maganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered, packed.
16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	24.25
Ton lots	26.15
Less ton lots	27.15

SMZ

Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots	20.15
Less ton lots	21.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots	17.30
Ton lots	18.70
Less ton lots	19.95

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 53%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	18.50
Ton lots to carload packed	19.65
Less ton lots	20.90

Ferromanganese

Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	12.75
Johnstown, Pa.	12.75
Sheridan, Pa.	12.75
Philo, Ohio	12.75
S. Duquesne	12.75

Add or subtract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk	14.80
Ton lots packed	17.20

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$100.50
19 to 21%	3% max.	102.50
21 to 23%	3% max.	105.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.
95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.75
Ton lots	47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads	34.00
Ton lots	36.00
250 to 1999 lb	38.00
Premium for Hydrogen-removed metal	0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn... 25.50

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	37.15	39.95	41.15
0.07% max. C	35.10	37.90	39.10
0.10% max. C	34.35	37.15	38.35
0.15% max. C	33.60	36.40	37.60
0.30% max. C	32.10	34.90	36.10
0.50% max. C	31.60	34.40	35.60
0.75% max. C, 80.85% Mn, 5.0-7.0% Si	28.60	31.40	32.60

Silicomanganese

Contract basis, lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b shipping point

Carloads bulk	12.80
Ton lots	14.45
Briquet contract basis carloads, bulk, delivered, per lb of briquet	15.10
Ton lots, packed	16.50

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $106.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, packed.

	Ton lots, packed	Carloads, packed
96.75% Si, 1.25% Fe	23.70	22.40
98% Si, 0.75% Fe	24.45	23.15

Silicon Briquets

Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.

Carloads, bulk	7.75
Ton lots, packed	10.50

Electric Ferrosilicon

Contract prices, cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si	13.00	75% Si	16.40
65% Si	15.25	85% Si	18.10
	90% Si	19.50	

Ferrovanadium

50-55% V contract, basis, delivered, per pound, contained V, carloads, packed.

Openhearth	3.30
Crucible	3.30
High speed steel (Primos)	3.40

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	32.05	32.95	33.75
Less ton lots	2.40	3.30	4.55

Alsifer, 20% Al, 40% Si, 40% Fe.

Contract basis, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads	10.65¢
Ton lots	11.80¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound Contained Mo $1.35

Ferrocolumbium, 50-50%, 2 in. x D contract basis, delivered per pound contained Cb.

Ton lots	$5.10
Less ton lots	5.15

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, contract basis, del'd ton lots, 2-in. x D per lb con't Sb plus Ta..... $4.35

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth Pa., per pound contained Mo.. $1.65

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $4.00 unitage, per gross ton..... $90.00
10 tons to less carload..... $110.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb. contained Ti..... $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti..... $1.50
Less ton lots $1.54

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $240.00

Ferrotungsten, ¼ x down, packed, per pounds contained W, ton lots delivered..... $2.95 (nominal)

Molybdic oxide, briquets, per lb contained Mo, f.o.b. Langeloth, Pa. $1.41
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.31

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per lb.

Carload, bulk lump	18.50¢
Ton lots, packed lump	20.50¢
Less ton lots	21.00¢

Vanadium oxide, 86-89% V_2O_5 contract, basis, per pound contained V_2O_5 ..... $1.30

Zirconium contract basis, per lb of alloy

35-40% f.o.b. freight allowed, carloads, packed	27.25¢
12-15%, del'd lump, bulk-carloads	9.25¢

Boron Agents

Borosil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B
2000 lb carload..... $5.50

Bortam, f.o.b. Niagara Falls,

Ton lots per pound	45¢
Less ton lots, per pound	50¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b., Suspension Bridge, N. Y., freight allowed.
Ton lots per pound..... 14.00¢

Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots.... 1.30
F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up

10 to 14% B	.85
14 to 19%	1.20
19% min. B	1.50

Grainal, f.o.b. Bridgeville, Pa., freight, allowed, 100 lb and over

No. 1	$1.05
No. 79	50¢

Manganese-Boron, 75.00% Mn, 15.20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots	$1.45
Less ton lots	1.50

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots..... $2.15

RAILWAY EQUIPMENT

FOR SALE

Used - As Is - Reconditioned

RAILWAY CARS

All Types

SERVICE-TESTED

FREIGHT CAR REPAIR PARTS

For All Types of Cars

LOCOMOTIVES

Diesel, Steam, Gasoline
Diesel-Electric

WANTED

Air-Operated Side Dump Cars
Hopper Type Ore Cars
Standard Gauge

RAILWAY TANK CARS and STORAGE TANKS

6,000- 8,000- and 10,000-Gallon
Cleaned and Tested

CRANES

Overhead and Locomotive

IRON & STEEL PRODUCTS, Inc.

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Chicago 33, Illinois
Phone: Mitchell 6-1212

New York Office
50-B Church Street
New York 7, N. Y.
Phone: BEekman 3-8230

"ANYTHING containing IRON or STEEL"

West Coast Expects Best Year Ever

Used machinery dealers there aren't worrying too much about recent sales dips.

With business at record pace there's more concern about getting tools to fill orders.

■ Will this be the biggest year yet for West Coast used machinery dealers? It's a good bet it will. Nearing mid-year, business keeps rolling at a record pace.

San Francisco sales are going merrily along at top speed. Southern California and Seattle dealers report dips in sales in the past few weeks. But there's nothing substantial to change the bright whole-year outlook.

Supply Search—One fly in the ointment is the short supply of late-model machines in good condition. Dealers are chasing all over the country trying to line up good buys.

Used machinery dealers in the San Francisco area are crying the blues—and for a reason that should make dealers in other sections of the country green with envy: demand exceeds supply.

"Good late models just aren't available," one dealer reports. Radial drills, one of the hotter items on the selling list, simply "are not to be had," this dealer complained.

Old Equipment Drags — Some firms say they can fill part of their needs in the East — Cleveland, Detroit, and Cincinnati. Others say even such long-distance efforts fail to fill the bill.

Post-war merchandise still continues in strongest demand. One dealer, who complained bitterly of the supply pinch, said real old tools just don't move. "They're dead ducks," he adds.

Prices are holding firm on used machinery. Good equipment, reconditioned, brings up to 70 pct of new merchandise—which is, in some cases, as much or more than the used item cost originally.

No Softening Noted—Although used equipment sold now is a year older than last year, prices have not softened any. This, one dealer pointed out, is equivalent to a price boost of about 10 pct.

The flood of new plants continues to keep the San Francisco Bay Area machinery market tight. Some concerns talk of credit problems—that marginal operators can't always finance what they'd like to buy. But this apparently isn't too serious a stumbling block at present.

When available, milling machines and turret lathes, in addition to radial drills, find new homes in a hurry.

Slow In The North — In the Seattle area, two general price cuts within the past two months haven't helped a slow market for used machinery.

Very little is moving. Local dealers are at a loss to explain the slowdown.

Specific trends noticed: machine tool users seem to be buying new foreign tools rather than used American-made equipment. Local dealers say the prices for new foreign-made items such as lathes and milling machines are about the same as for three-to-five-year-old U. S. tools.

CONSIDER GOOD USED EQUIPMENT FIRST

AIR COMPRESSOR
450 cu. ft. Ingersoll Rand XRE, 100# Pressure
100 H.P. Westinghouse Motor 440/3/60

BENDER & STRAIGHTENER
Pels JH-26 All Steel Bender & Straightener Cap'y 15" Beams, 18" Channels, 8x8x1⅛" Angles

BENDING ROLLS
16' x ⅝" Ransome Pyramid Type
27' x 1" Southwark, Pyramid Type

BRAKES—LEAF TYPE
8' x 3/16" Dreis & Krump
12' x ¼" Dreis & Krump
12' x ⅜" Dreis & Krump No. 228

BRAKES—PRESS TYPE
8' x ⅛" Geo. A. Ohl
14' x ¾" Superior Hydraulic—NEW

BULLDOZERS
#27 W&W, 22" Stroke, 16" x 80" Face of Crosshead
#7 Ajax, 22" Stroke, 12" x 65" Face of Crosshead

CRANES—OVERHEAD ELECTRIC TRAVELING

5 ton P&H	56' Span 220/3/60
5 ton Euclid	30' Span 220/3/60
5 ton Whiting	48' Span 230/3/60 A.C.
8 ton P&H	55' Span 220/3/60
10 ton Shepard Niles	27' Span 220/3/60
10 ton Shepard Niles	58' Span 220/2/60
15 ton Shepard Niles	52' Span 230 Volt D.C.
25 ton Cleveland	70' Span 220/3/60

With 10 ton Auxiliary (Mill Type)

CRANE TROLLEY
10 ton P&H Type HMR Crane Trolley, Motors 440/-3/60, Magnetorque Contactor, Panel

DIEING MACHINE
30 ton Henry & Wright, Roll Feed, Scrap Cutter 4" Stroke NEW 1950

FORGING MACHINES
1" to 5" Acme, Ajax, National
5" Acme Model XN, Air Clutch, NEW 1954

HAMMERS—BROAD DROP—STEAM DROP—STEAM FORGING—800 lb to 20,000 lb.

LEVELERS—ROLLER
37" Torrington, 19 Roll 1-31/32" Dia. Backed up
48" Aetna Standard, 17 Rolls 3⅜" Dia.
54" Mekay, 17 Rolls, 3⅜" Dia.
108" American, 17 Rolls, 4½" Dia.

PLANER—PLATE EDGE
36" Southwark Pneumatic Holddown, Motor Driven, Capacity 1½"

PLATE SPACING MACHINE
For plates 4' to 30' long, With two Billes & Jones Punches, 18" Throat

PRESSES—HYDRAULIC
200 ton Farquhar Straightening Press 18" Stroke, Working Area 12" long
800 ton Clearing 48" Stroke, Bed 48 x 48"
4500 Baldwin-Lima-Hamilton Hydr. Forging Press

PRESS—INCLINABLE
#A6½ Niagara 190 ton, 9⅜" Stroke Bed Area 32½" x 50⅝"

PRESSES—STRAIGHT SIDE
110 ton Cleveland 55D-54, 5" Stroke
Bolster 32" x 54", Air Cushion
150 ton Cleveland 65D-60, 6" Stroke
Bolster 40" x 60", Air Cushion
400 ton Warco #2-108, 18" Stroke
Bolster 66" x 108", Air Cushion

PUNCH & SHEAR COMBINATIONS
Cleveland Style EF Single End, 42" Throat
Cleveland Style G Single End, 60" Throat
Cleveland Style W, 80" Throat
No. 1½" Buffalo Universal Ironworker

ROLL—FORMING
14 Stand Tishken Model L-M-1, Spindle Dia. 1⅜"
6⅝" Between Spindles, 3½" Capacity

ROLLING MILLS
6" x 5" Torrington Wire Flattening Mill Line
9" Bar Mill
10" x 14" Single Stand Two High
12" x 12" Single Stand Two High
12" x 16" Single Stand Two High
16" x 24" Farrel Two Stand Two High
26" x 72" Cold Rolling Mill
22" x 40" Three High Sheet Mill

SHEAR—ALLIGATOR
No. 4 Mesta RH LK, Capacity 2" x 12"

SHEARS—BAR
No. 12 Buffalo Armor Plate
Capacity 5" to 15" Beams & Channels
18" Mesta Bar Shear, Capacity 4" x 35" Slabs Hot, Motor Drive with 75 H.P. D.C. Motor

SHEARS—SQUARING
6' x 10" Ga. Niagara No. 672
8' x ¼" Niagara—NEW 1952

SLITTERS
25" Blake & Johnson
36" Wean Slitting Line
36" Paxson Slitting Line
42" Illinois Slitting Line

STRAIGHTENER
No. 3 Medart 3 Roll, Capacity to 4½" Tubing

SWAGING MACHINES
#4D 1 cent, Capacity 2¼" Tubing, LATE
#6½A Fenn, Capacity 2¾" Tube 3⅜" Solid 10" Die Length Hydraulic Feed, LATE

TESTING MACHINE
20,000# Baldwin Universal Hydraulic

● Manufacturing

A. T. HENRY & COMPANY, INC.

50 CHURCH ST., NEW YORK CITY 8
Telephone COrtlandt 7-3437

Equipment ●

Confidential Certified Appraisals
Liquidations — Bona Fide Auction Sales Arranged

Consulting Engineering Service
Surplus Mfg. Equipment Inventories Purchased

2000# Chambersburg Pneumatic Forging Hammer Late Type, Serial 20CH392L7.

2500 lb. Erie Single Leg Steam Forg. Hammer

No. 7 Ajax Forging Press, 700-ton capacity

3—2-ton Denison Auto. Hopper Feed & Index Table Hydr. Multipress

25 Transformer and Generating Arc Welders

2500 lb. Model E Chambersburg Steam Drop Hammer, New 1944

6' x 10 ga. Cincinnati Squaring Shear ¼" x 8' P. & W. Gate Shear; 20" throat

4" National High Duty Upsetting & Forging Machine, air clutch, also one with regular clutch, also 1", 2", 3" air clutch

Williams White Bulldozers from 5-ton to 300-ton

Landis Landmaco and other Landis Threading Machines

Single & Double End Punches

No. 3 Motch & Merryweather Saw, with Saw Grinder

BOLT, NUT AND RIVET MACHINERY, COLD HEADERS, THREAD ROLLERS, THREADING MACHINES, TAPPERS, COLD BOLT TRIMMERS, SLOTTERS, HOT HEADERS AND TRIMMERS, COLD AND HOT PUNCH NUT MACHINES.

DONAHUE STEEL PRODUCTS CO.

1919 W. 74th Street, Chicago 36, Ill.

RE-NU-BILT
GUARANTEED
ELECTRIC POWER EQUIPMENT
DC MOTORS

Qu.	H.P.	Make	Type	Volts	RPM
1	2200	G.E.	MCF	600	400/500
3	1375	G.E.	MCF	415	1300
1	1200	G.E.	MCF	600	450/600
1	940	Whse.	QM	250	140/170
1	800	Whse.	QM	250	250/350

With United Gear Set 7:1 Ratio

3	450	Whse.	MPC	550	415
2	300	G.E.	MPC	220	400
1	250	G.E.	MPC	230	400/600
2	200	Whse.	CB-207-4	250	850/1200
1	150	G.E.	CD B.B.	600	250/700
1	150	Cr Wh.	65-H	230	1150
1	125	Whse.	SK-185	230	550/1050
1	125	Whse.	SK-183	230	850
2	100	Whse.	SK-181	230	450/1000
1	60/100	G.E.	RP-17	220	450/600
1	75	Cr Wh.	53-H TEFC	230	860
1	50	G.E.	MD-412-AE	230	550
6	40	Rel.	385F TEFC BB	230	500/1500
2	30/40	Whse.	SK-131.5-BB DP	230	500/1500
3	(unused)	30	G.E.	CDM-85 BB	230	2200

MG SETS — 3 Ph. 60 Cy.

Qu.	KW	Make	RPM	DC Volts	AC Volts
2	2000/2100	G.E.	450/500	250/300	2300/4600
1	2000	G.E.	257 cy.	600	11000
1	2000	G.E.	514	600	2300/4600
1	1500	G.E.	720	600	6600/13200
3	1000	G.E.	720	600	6600/13200
2	1000	G.E.	514	600	6600/13200
1	750	G.E.	720	125/250	2300/4600
1	500	Whse.	900	125/250	440
2	500	G.E.	1200	250	2300
2	300	Whse.	1200	275	440/2200
1	200	Whse.	1200	550	2300
1	200	G.E.	1200	250	440

TRANSFORMERS

Qu.	KVA	Make	Type	Ph.	Voltages
1	3000	A.C.	OISC	3	2300 x 2300
1	1500	G.E. auto	HT	3	4000-4200/4400
2	1000	G.E.	HYDDJ	1	2400 x 480
3	1000	G.E.	OA/FA	1	13800 x 230/460
1	833	G.E.	H	1	12800 x 460
2	750	G.E.	Pyranol	1	4800 x 83.33
3	500	Kuhl.	OISC	1	13200 x 6600
1	500	G.E.	OISC	1	13200 x 2300
1	500	G.E.	HS	3	12800 x 600
1	300	G.E.	HT	3	4160 x 480-277
1	200	G.E.	AirCooled	3	432 x 480 x 120/208Y
3	150	G.E.	OISC	3	22000 x 2200/4000Y
1	50	G.E.	Askerel filled	3	13200 x 120/208Y
(unused)					

BELYEA COMPANY, INC.

47 Howell Street, Jersey City 6, N. J.

REBUILT — GUARANTEED
ELECTRICAL EQUIPMENT

COMPLETE PACKAGE MILL DRIVE IN STOCK

(1)—800-HP., Whse. motor, 168 R.P.M., 710 VDC, sep. excited fields
(1)—720/850-KW Whse. M-G Set, 600/710 VDC, Diff. Comp driven by a synchronous motor 900 R.P.M., 4000/2300-volt, 3 phase, 60 cycle.
(1)—Starting panel for syn. motor
(1)—4 unit exciter set
(1)—Set of variable voltage control

IDEAL REEL DRIVES

(2)—600-HP Allis-Chalmers mill motors, 600-VDC, 300/600 R. P. M., with a 1200-KW, 600-VDC Westinghouse M-G Set, 1750-HP synchronous motor, 4160/2300-Volt, 3 phase, 60 cycle.

(2)—275-HP Westinghouse mill type motors, 230-Volt, 425/850 R.P.M., with 2 or 3-unit, 600-KW M-G Set, 250-VDC and 900-HP synchronous motor, 2300-Volt, 3 phase, 60 cycle.

(2)—100-HP Electro-Dynamic motors, 230-VDC, 450/1350 R.P.M., with 3-unit, 300-KW Allis-Chalmers M-G Set, 2300/440-Volt, 3 phase, 60 cycle.

SPECIAL

(2)—600-HP Westinghouse mill motors, 230-VDC, 110/220 R.P.M., anti-friction pedestal bearings.

MOTOR GENERATOR SETS

Qu.	KW	Make	RPM	DC Volts	AC Volts
1	1500	G.E.	514	250	4000/2300
2	1000	Whse.	720	250	2300
2	500	Whse.	1200	125/250	2300
1	200	G.E.	1200	250/275	2300
1	300 (3-unit)	Al. Ch.	1200	250/300	2300
3	200	Whse.	1200	125/250	2300
2	150	Rel.	1200	125	2200
2	150	Whse.	1200	125/250	2300
1	150	G.E.	1200	250	4600/2300
1	100	Al. Ch.	1200	250	4600/2300
1	100	Whse.	720	125/250	2200
1	75	Whse.	1200	125/250	2200

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4302 Clarissa St., Philadelphia 40, Penna.

Cable Address	Phone
"Macsteel" Philadelphia, Pa.	Davenport 4-8300

SMALL 2HI COLD ROLLING MILLS

6" dia by 8" f Standard, Roller Bgs. 15 HP
6" dia by 5" f Standard, Grading Mill, 10 HP
5" dia by 8" f Standard, Roller Bgs. 7½ HP
3" dia by 5" f Ruesch, Bz Bgs. 3 HP "V" Belt
4" dia by 2½ f Buffalo, Bz Bgs, Flat Wire
Also 12", 16" & 20" 2HI Cold Mills.

F. H. CRAWFORD & COMPANY, INC.
30 Church Street **New York 7, N. Y.**

BENNETT MACHINERY CO.

NEW BATH PRESS BRAKES

10' x ¼" No. 150-10, 150 ton, 12' bed
10' x 3/16" No. 120-10, 120 ton, 12' bed
10' x 8 ga No. 100-10, 100 ton, 12' bed

375 Allwood Rd., Clifton, New Jersey
Phone PAterson 9-8994 N. Y. Phone LOngacre 3-1222

6' x 10 ga. Parker Power squaring shear, 1947, M.D.
No. ½, No. 1½ Buffalo Forge Univ. Ironworkers, Coper, Notcher, M.D.

FALK MACHINERY COMPANY

16 Ward St. **Baker 5887** **Rochester 5, N. Y.**

1—14" & 32" x 48" COLD MILL, 4-HIGH, with combination pinion stand and gear reducer, motor driven screwdown.
2—28" 3-HIGH ROLL STANDS with inlet, outlet and intermediate tables. Will produce 4" sq. billets from 8" sq. blooms in 6 passes. Includes bloom shear.
1—28" REVERSING BREAKDOWN MILL.
1—25" & 42" x 60" HOT STRIP MILL, 4-high.
1—28" PINION STAND, 2-high, modern design.
1—16"x24" COLD MILL, 1 stand.
2—10" x 10" 2-HIGH COLD MILLS, combination pinion stand and gear set, extra forged steel rolls.
1—10" ROD MILL.
2—MECHANICAL COOLING BEDS for bars, 150 ft. and 120 ft. long.
1—ROLL FORMING MACHINE, Kane & Roach for .072" x 5⅝" wide stock.
1—COIL-UP-AND-DOWN ENDER for 54" dia. x 44" wide coils.
1—34" x 192" ROLL GRINDER with motors and controls.
1—44" ROLL LATHE, enclosed headstock, tailstock, piano rest, 20 HP 500-1500 RPM, 230 volts D.C. motor and controls.
2—ROLLER LEVELERS, McKay, rolls 80" face & 3¼" dia., with gear box and universal spindles.
1—STRETCHER LEVELER for sheets, 500,000 lb. capacity.
1—KANE & ROACH BAR AND ANGLE STRAIGHTENER, size 2½, cap. 4" x 4" x ½" angles 5" channels, 2¼" bars.
2—KANE & ROACH BAR AND ANGLE STRAIGHTENERS, size 4, cap. 3" x 3" x ⅝" angles, 3½" channels and 2" bars.
1—LOCOMOTIVE, 62½ ton Diesel Electric.
2—UNITED HOT SAWS, 50", sliding frame.
1—BONNOT BILLETEER, size "A," cap. 3" to 6" Squares.
1—UNITED 4 BAR SHEAR, vertical open side.
1—PELS BILLET AND BAR SHEAR, cap. 7" round, 50 HP motor.
1—CRACKER SHEAR, AETNA-STANDARD, 2½" bars.
1—ALLIGATOR SHEAR, cap. 4" sq. or 5" rd., with 35 HP motor, blades 23½" long, weight 60,000 lbs.
1—ROTARY SIDE TRIMMING SHEAR, capacity 112" x ⅝" plate.
1—192" x 10 GAUGE NIAGARA SQUARING SHEAR, little used.
1—156" x ¼" SHEET SQUARING SHEAR.
1—SLITTING SHEAR FOR SHEETS, Mesta 92".
1—FLYING SHEAR, capacity ½" thick x 36" wide in lengths from 2½ ft to 12 ft.
1—ALLIANCE LADLE CRANE, 4 girders, 80 ton main hoist, 25 ton auxiliary, 55'5" span, 42' lift.
1—DRAWBENCH, Mesta, oil-hydraulic, for 3 strands of bars 20' long.
8—PICKLING MACHINES for sheets, Mesta.
1—SCRUBBER AND DRYER for sheets 66" wide
2—PACK FURNACES for hot sheet mills, 62" x 60', double chamber.
1—66" GALVANIZING LINE for sheets, with 2 roller levelers.
3—LIFT TRUCKS, 5-ton Elwell-Parker.
1—3500 HP GEAR DRIVE, 514 to 80 RPM, 6.45 to 1 ratio.
1—2000 HP GEAR DRIVE, 200-580 RPM input, 4.44 to 1 ratio.
1—1600 HP GEAR DRIVE, 514 to 87 RPM, 5.9 to 1 ratio.
1—1200 HP GEAR DRIVE, 353 to 94.6 RPM, 3.73 to 1 ratio.
1—3500 HP MOTOR, 11000 volts, 3 phase, 60 cycle, 514 RPM.
1—1200 HP MOTOR, 2200 volts, 3 phase, 60 cycle, 353 RPM.
1—MC-30 WEST. MOTOR, 230 V. D.C. back axle brackets and shaft.
1—MC-20 WEST. MOTOR, 230 V. D.C. back axle brackets and shaft.

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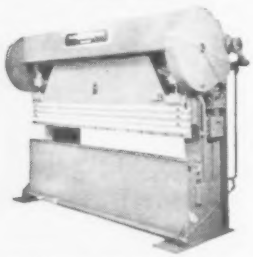
IMMEDIATE DELIVERY
BRAND NEW
CYRIL BATH
(STURDYBENDER)



POWER PRESS BRAKES

#100- 8	8' x 3/16"	10' Bed
#100-10	10' x 8 GA.	12' Bed
#120-10	10' x 3/16"	12' Bed
#150- 8	8' x 5/16"	10' Bed
#150-10	10' x 1/4"	12' Bed

Purchasers of Cyril Bath Brakes are entitled to services of a factory representative to assist and supervise installation, and instruct personnel in operation and maintenance. NO CHARGE FOR THIS SERVICE.

PRESS & SHEAR MACHINERY CORP.
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These Brakes are available for lease with option to purchase, or will finance over long term.

WE OWN AND OFFER FOR SALE

Two 35-Ton Ohio Locomotive Cranes—
Equipped with 50-ft. booms. Gas Powered

Excellent Condition
IMMEDIATE SHIPMENT

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FOR SALE
COMPLETE BAR & ROD ROLLING MILL IMMEDIATELY AVAILABLE
Suitable for Rolling Steel or Copper billets down to bar or rod sizes, including hotbed, shears, and rod coiler.
STILL SET-UP, REASONABLY PRICED FOR IMMEDIATE SALE
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Dismantling Large Steel Installation

- Steel Frame Building 48'x220' clear span, 45' to eaves. Includes craneway. Modern type building in excellent condition.
- Large quantity of ¼" raised pattern checked-steel plates 4'x10' and larger.
- Several tons of good 6" I beams—10' long and 10" Jr. Beams 20'. Also good supply of miscellaneous angles and beams in long lengths.
- Corrugated transite siding.

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CARLTON MODEL 5A 10'-26". Power Head and Column Clamping, Power Head Traverse, Power Elevation, Motor on Arm. New 1942.

AMERICAN 7'-17" HOLE WIZARD. Power Clamping, Power Elevation, Power Head Traverse, Motor on Arm. New 1945.

Both machines in excellent condition

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WIRE & ROD MILL MACHINERY

VAUGHN Wire Drawing Machine, 4-22" D.A., complete with motor, all controls. Purchased new in 1947. A bargain. Also many other wire and rod mill machines. Call or write R. Jacobs, Plume & Atwood Mfg. Co., Thomaston, Conn.

ATlas 3-4331.

BLOWER

North American, 5000 cfm, 20 oz. w/50 hp GE 60 cycle, 3 phase, 220/440

STORAGE TANKS

1—9000 gal. 1—10,000 gal., welded construction, 96" dia, Cradled horizontally in 8" pipe frame. A-1

JOSH STEEL COMPANY
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BR. 1-0050

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Hufford 80,000# capacity, Hydraulic Stretcher, Leveler and Former—for extrusions and sheets, like new—1951.

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No. 5-90 x 4' Cinn. Press Brake, NEW.
Fellows Str. Line Gear Generators.
3" Red Ring Shaver, 1942.
No. 2510 x 10' Cinn. Shear, 1937.

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STAMPING PRESSES

BLISS • CLEARING • CLEVELAND
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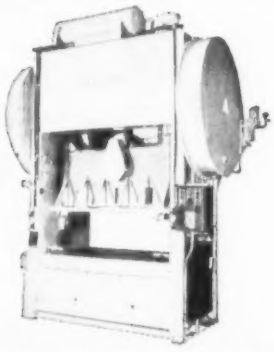

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JOSEPH HYMAN & SONS
TIOGA, LIVINGSTON & ALMOND STS.
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LARGE LATHE

60" x 45' or 70' C.C.

Mackintosh-Hemphill, New 1943, 62' Bed, Heavy Duty, 2 M. D. Carriages, Geared Head, Screw-Cutting, 60" Face Plate, 3 Steady Rests, Additional 25' Bed Section Allowing 70' Centers, Wt. Approx. 160,000 lb.

Republic Machinery Company
THOMAS J. O'BRIEN, PRES.
134 N. 3RD ST., PHILA. 6, PA.
WAlnut 2-5513

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MACHINERY & EQUIPMENT CO.

MELTING FURNACES
3 KW AJAX Spark Gap Converter
20 KW AJAX Spark Gap Melting Unit
250 lb LECTROMELT Arc Melting Furnace
1½ Ton LECTROMELT Arc Melting Furnace
2 Ton LECTROMELT, Size Q, Arc Melting Furnace
1500 lb HEROULT Arc Melting Furnace

HEAT TREAT FURNACES
50 KW GE 530 KC Tube Type Furnace
200 KW TOCCO Induction Heater
1—Gas Fired, 5' 6" x 8' I.D. Pit
1—L&N, 72 KW, 25" x 48" Electric Pit

CLEANING EQUIPMENT
15" Cont. AMERICAN Tumblast, 4 tons per hour
36" Cont. AMERICAN Tumblast, 15 tons per hour
48 x 42 WHEELABRATOR w skip loader
48 x 48 WHEELABRATOR w skip loader
PANGBORN Tablast 8' diameter
PANGBORN Shot Blast Machine, 5 Wheel Type

Large Stock of Detroit Melting Furnaces

AMERICA'S LARGEST STOCK OF FOUNDRY EQUIPMENT

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Dealers in new and used OET Cranes and Structural Steel Buildings.
Send us your inquiries.

eastern Rebuilt Machine Tools

THE SIGN OF QUALITY—THE MARK OF DEPENDABILITY

BALL BEARING DRILLS
No. 4 Fosdick, 8" overhang, High Speed, m.d.
No. 15 Buffalo Floor Model, m.d.
No. ½, 1 & 2 Avey, m.d.
No. ½ Avey MA-8, m.d.
No. 18 Edlund, m.d., new
No. 4BM Fosdick single spindle, H.S., m.d.
1 spindle No. 2MA6 Avey High Speed, m.d., 7½" overhang, 1943
No. 2B—8" H.D. Edlund H.S., m.d.
2 spindle Allen, belted m.d., 8" overhang
2 spindle No. 2 Avey High Speed, belted m.d.
2 spindle No. 2B MA1 Avey Production Type, m.d.
2 spindle Avey, size No. 1, Type B, Style VHP, m.d., 8" overhang
2 spindle No. 3 MA6 Avey high speed, m.d.
2 spindle No. 2 Leland-Gifford High Speed, 8" overhang, m.d.
2 spindle Leland & Gifford High Speed Hydraulic Type, m.d.
No. 2LMS Leland-Gifford, single spindle, High Speed, m.d.
No. 2LMS Leland-Gifford, H.S. Hydraulic Feed, m.d.
3 spindle No. 2MA6 Avey High Speed, m.d.
3 spindle Leland & Gifford #1 LMS—High Speed, m.d., late
3 spindle Leland & Gifford High Speed, m.d.
3 spindle Delta H.S., 4 speed vee pulley drive
4 spindle Leland & Gifford, m.d. on each spindle
6 spindle Leland & Gifford, m.d. on each spindle, No. 2 taper
6 spindle No. 1 Avey High Speed, m.d.
6 spindle Model M 1613 Pratt & Whitney In Line Vertical, m.d.
No. 410 Barnes Single Spindle Deep Hole, m.d.

HORIZONTAL DRILLS
No. 2 Avey Style MA, 1, with horizontal operation
3 way Natco Horizontal Drill, consisting of 3 E13 Holeunits
No. ½Bx50" Pratt & Whitney Gun Barrel Rifling Machine, m.d., latest
No. 1½x105" Pratt & Whitney 2 spindle Gun Barrel Rifling Machine, m.d.
No. 1 Model M509 Pratt & Whitney 2 spindle Deep Hole Drill, belted m.d.
Model 410 W. F. & John Barnes, 2 spindle Hydraulic Deep Hole, m.d.
Pratt & Whitney Deep Hole Sharpener, m.d.
Natco Horiz. Drill, holesteel model, m.d., 1942

We carry an average stock of 2,000 machines in our 11 acre plant at Cincinnati. Visitors welcome at all times.

THE EASTERN MACHINERY COMPANY
1002 Tennessee Avenue, Cincinnati 29, Ohio
MElrose 1241 "TWX" CI 174 CABLE ADDRESS—EMCO

TOTAL OF 17,500-KW IN M.G. SETS

5—3500-KW, 3 Unit, Allis-Chalmers, Motor Generator Sets, Each consisting of:
2—1750-KW, 250/350 Volts parallel, 500/700 Volts series, 514 RPM, 5000 Amp., type HCC, rated continuous at 40 Deg. C. Allis-Chalmers DC Generators with Class B Insulation, separately excited, direct connected in the center to:
1—5000-H, 3730-KW, 13800 Volts (6900 Volts), 3 Phase, 60 cycle, 514 RPM, 162 Amps., Allis-Chalmers, Synchronous Motor with Class B Insulation, rated continuous at 40 Deg. C. Rise.
Each set equipped with a 40-KW exciter for synchronous motor fields, and a 10-KW exciter for generator fields, both 250-VDC at 514 RPM.
All mounted on a structural steel base approximately 27' long x 11' wide.
These Units are of the very latest type and design—condition excellent—were used only a short time—AC and DC Switchgear available. For any additional information and price, please contact one of the following dealers closest to you:

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Moorehead Electrical Machinery Co.
120 Noblestown Road, Oakdale (Pittsburgh District), Pennsylvania
Brazos Engineering Co., Inc.
P. O. Box 9114, Houston, Texas
Duquesne Electric & Mfg. Co.
6428 Hamilton Avenue, Pittsburgh 6, Pa.

USED STEEL MILL EQUIPMENT FOR SALE

3—Travograph Shape Cutting Machines—Airco's #41

1—McKay Roller Leveler, 9 working rolls, 15" x 90" face, capacity 1" to 1½" plate, 2 pinch rolls, 2 back-up rolls, motor screw-down, complete with delivery and take-off, conveyors, motors, etc.

5—Roll Heating Furnaces—Stationary Type—Steel Frame—brick lined, natural gas fired.

22—Annealing Furnaces, Bell Type, various sizes, included are 6 Trans.

Lou F. Kinderman
Box 182 - Niles, Ohio • Phone OL 2-9876

GOOD USED MACHINERY

HAMMERS
40 lb. Bradley Helve
100 lb. Murco upright power
300 lb. No. 3C Chambersburg, forging
700 lb. No. 6-1 Nazel, pneumatic, forging
1250 lb. No. 6-B Nazel, pneumatic, forging

LATHES, AUTOMATIC
8" x 15" Fay
No. 9 WSL Reed, new 1946, 9½" swing
No. 8 Gisholt hydraulic, Timken bearing, 12" swing, 1950
No. 12 Gisholt, 1945, Timken bearing, 12" swing
12" x 21" Fay
16" x 33" Fay, new in 1941
20" x 25" Fay
Gisholt, Simplimatic, automatic, platen type
No. 3D Gisholt Simplimatic, platen

LATHES, PRODUCTION
No. 6 LeBlond Multi-cut, swings 6" dia.
12" x 18" Porter Cable high speed, carbo, production
15" x 30" Lipe Carbomatic, hydraulic
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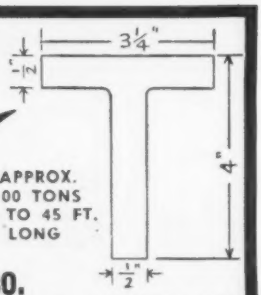

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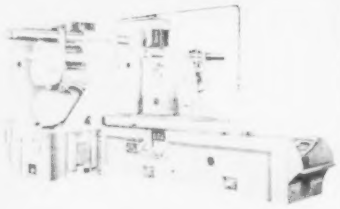

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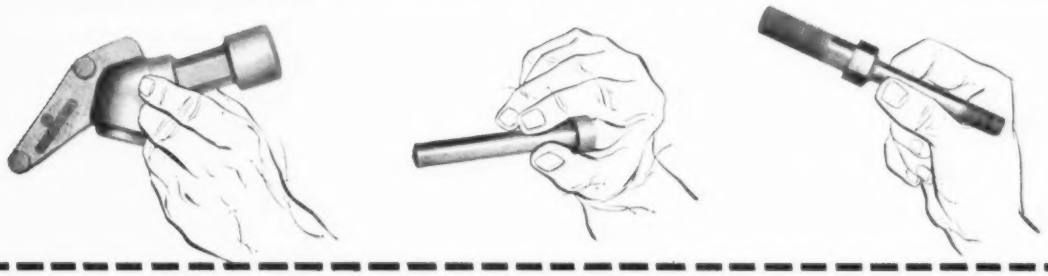

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Delaware River Project Doubted

Proposed deepening of the Delaware River between Philadelphia and Trenton, beyond the Fairless Works of U. S. Steel, may become a victim of the current congressional economy drive. A Senate appropriations subcommittee has been asked by the Delaware River Assn. to kill the project.

Steel Products, Shapes Hit High

Shipments of finished steel products for construction purposes and shipments of heavy structural shapes set records during March, the American Iron and Steel Institute states. Construction (including maintenance) received 1,120,545 net tons of steel directly from steel mills in March, as contrasted with the previous record of 1,061,300 tons in October 1956. Shipments of heavy structural shapes totaled 614,277 net tons in March, compared with 553,255 tons in October 1956, the former high month.

Nickel Priority Abuses Attacked

The government should crack down on abuses of the nickel priority system, and consider further expansion of production, according to a report from the Senate Preparedness Subcommittee. The subcommittee wants the ODM to "deal immediately and vigorously" with the disparity between estimated defense needs and actual defense use of nickel. It also wants regular reports from the Pentagon on what is being done to prevent this disparity, a review of the defense order rating system, conservation of nickel, including better scrap utilization, and consideration on whether the government should promote additional producing and refining facilities.

Steel Output Shows Drop Over '56

Steel production during the first four months of this year is about a million tons below comparable figures for the same part of last year, reports the American Iron and Steel Institute. Total for January through April this year was 41,399,042 net tons, as contrasted with 42,395,799 net tons a year ago.

Firm May Stockpile Its Own Zinc

St. Joseph Lead Co. is considering stockpiling its own production of lead and zinc if government buying of the metals under the farm surplus barter program is not resumed. This move, which the company took before during the 1930's, was proposed to St. Joseph stockholders at the firm's annual meeting.

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McKay Roller Leveller

For Sale: 90" Sheet Processing Machine, cost $35,000 in 1947. In excellent condition. Flexing roll arrangement mechanically operated, Farval Automatic Self-Lubricating System, Cleaning Spray System. Made by McKay Machine Company, Youngstown, Ohio, Serial No. 34-4120.

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CHUCKING MACHINES

Four, Five, Six, Eight Spindles • Work and Tool Rotating Type

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"DAVIS" KEYSEATER

Low in Cost. Durable. Easy to operate.
Table adjustable for straight or taper keyways.
Three sizes. Keyways 1/16" up to 1".

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400 Exchange St., Rochester 8, N. Y.

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GRIFFIN®
COLD ROLLED STRIP STEEL"

Made to your specifications in all thicknesses from .012 to .875 inches and widths from ⅛" to 19" depending upon gauge.

NARROW ROLLED ROUND EDGE STRIP STEEL *In stock at*
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FOR ELECTRIC FUSE
ELEMENTS
EYELETS ALSO BRASS OR STEEL

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STEEL TUBING

SEAMLESS or WELDED
AIRCRAFT • MECHANICAL
PRESSURE • STAINLESS
STAINLESS PIPE & FITTINGS

SERVICE STEEL

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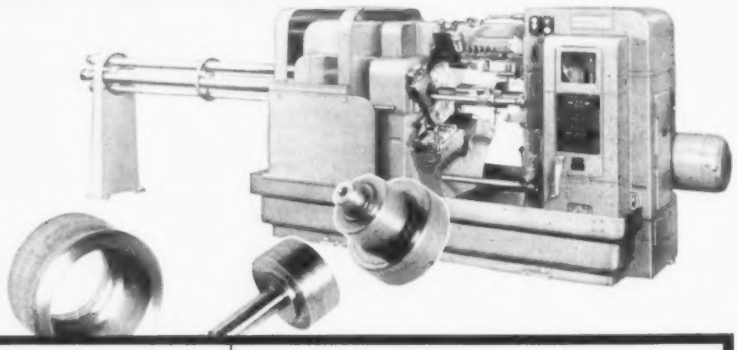
ARMSTRONG *Drop Forged*
HOIST HOOKS

Correctly engineered, drop forged and heat treated. Strong—max. load is 4 times rated "safe work load"; elastic limit approximately twice rated load. Inside hook sizes from ¾" to 4". Capacities ½ to 25 tons. For safe dependable service . . . specify ARMSTRONG Hoist Hooks. Write for Catalog.

ARMSTRONG BROS. TOOL CO.
"The Tool Holder People"
5209 Armstrong Ave. Chicago 30, U. S. A.

Warner & Swasey's cost-cutting Automatics boost production for Thor Power Tool Co.

Look at these typical time and cost savings delivered by Warner & Swasey 5-Spindle Automatic Bar Machines at Thor Power Tool's Aurora, Illinois plant.



AUTOMATIC BAR MACHINES
1¼" Bar Capacity
1¾" Standard Capacity
2¼" Oversize Capacity

AUTOMATIC CHUCKING MACHINE
6" Swing

Reduction Gear Blanks

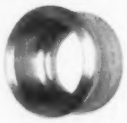
Savings pay for several new machines!

Large variety required—in lot sizes of 150-1500 pieces. Material — 8460 Steel.

Previous method — 2 single-spindle automatics, running continuously.

NOW — One Warner & Swasey 5-Spindle Automatic does complete machining in equivalent of 4 days a week.

Lock Collar



Slashes machining time on longer runs!

Quantities — 20,000 - 30,000 pieces.

Previous method — Run on conventional multi-spindle automatics in 75 seconds.

NOW — on Warner & Swasey 5-Spindle Automatics parts made in 27 seconds!

Thin Walled Protection Nut

Combines operations at high removal rate!

Previous method — Three operations — rough turned, relief cut made in second operation. Class 3 threads hobbed in third. Cost of last step alone ran 20 cents per part.

NOW — finished in one operation in 132 seconds on Warner & Swasey 5-Spindle Automatic.

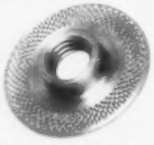
Reducer Bushing

Cuts Class 4 threads in same operation — costs reduced 8.5 to 1!

Previous method — Threads milled, following rough forming on single-spindle automatic.

NOW — Complete machining finished on Warner & Swasey 5-Spindle Automatic in one operation in 27 seconds!

Sanding Pad Nut



One machine does work spread over 3 departments!

Problem — To thread part at perfect 90° angle to outside face, and hold concentricity.

Previous method — Part machined in 3 different departments. Difficulty was experienced in holding piece in fixture for knurling.

NOW — Thread tapped into bar stock and balance of cuts made, including knurling, in one operation on Warner & Swasey 5-Spindle Automatic.

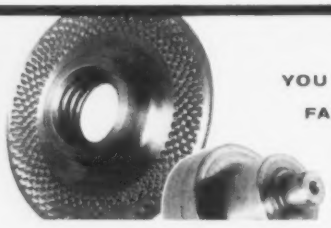
Drive Shaft Impact Spindles

Accuracy and rigidity deliver 4 to 1 savings!

Material — Super tough rivet set alloy, especially made for Thor.

Previous method — Roughed on single-spindle automatic, straddled to length on turret lathe — both machines running at half speed.

NOW — finished for grinding in single operation on Warner & Swasey 5-Spindle Automatic running at full speed.

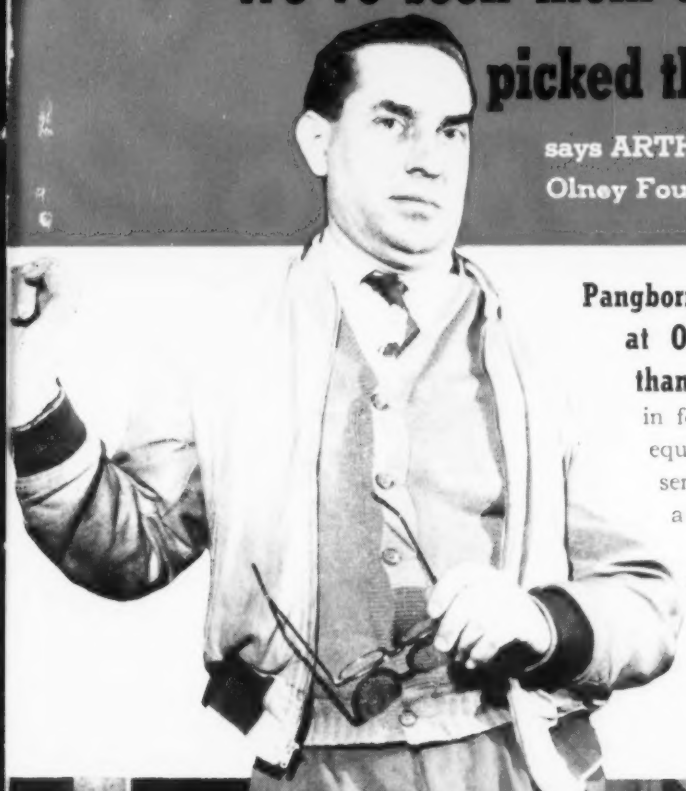


YOU CAN PRODUCE IT BETTER, FASTER, FOR LESS... WITH A WARNER & SWASEY

WARNER & SWASEY
Cleveland
PRECISION MACHINERY SINCE 1880

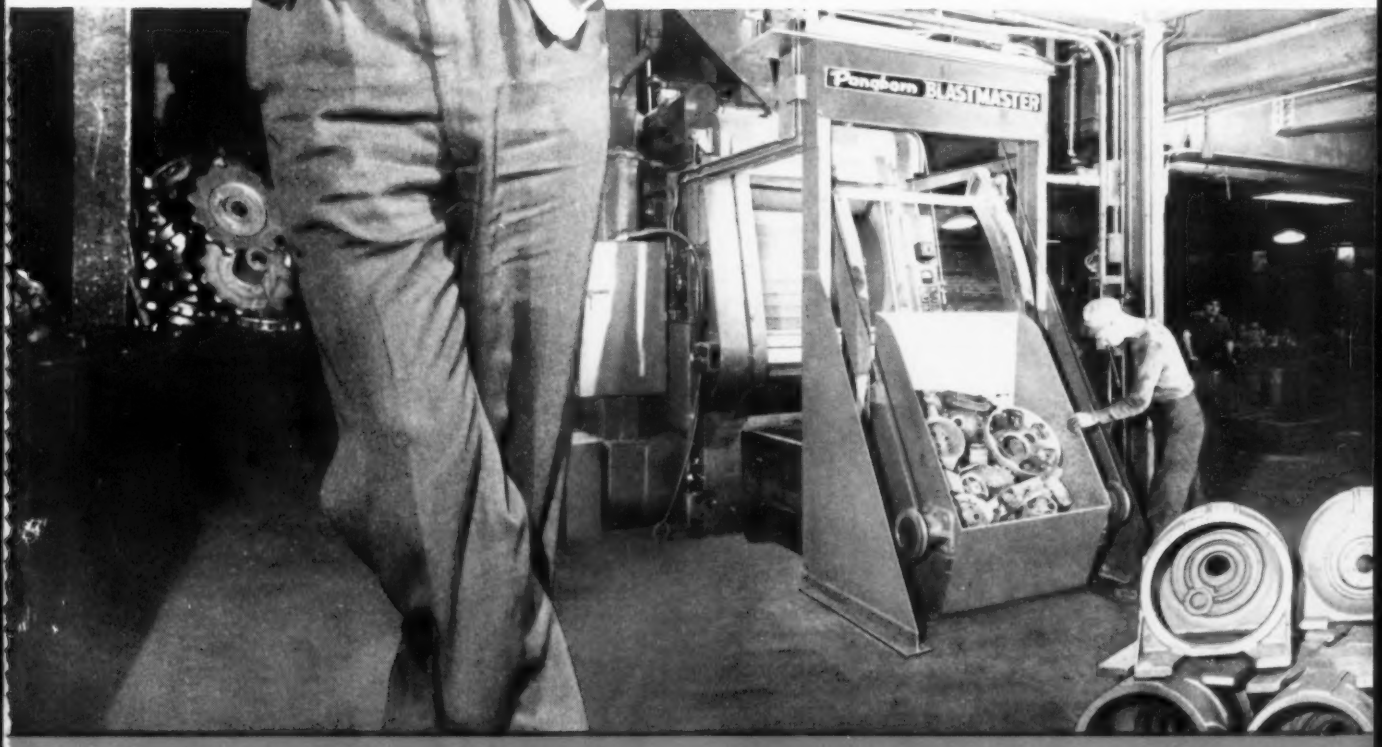
"We've seen them all... and picked the Pangborn Blastmaster®"

says ARTHUR LAKE, Plant Engineer,
Olney Foundry Div., Link-Belt Co., Philadelphia



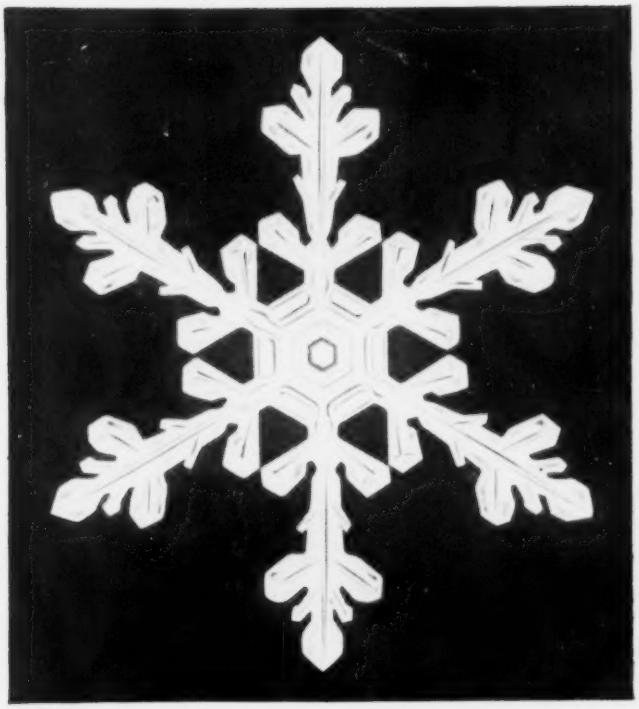
Pangborn machine cuts labor and maintenance costs at Olney, CLEANS 25% FASTER and BETTER than previous equipment. "We've had a lot of experience in foundry work," says Mr. Lake, "and we know foundry equipment. That's why we're sold on Pangborn construction, service and performance. Our Pangborn Blastmaster does a terrific cleaning job, does it *fast* and saves us money!"

If *you* need blast cleaning equipment, look at all makes. Then check the Pangborn Blastmaster. You'll find it offers many exclusive features plus a choice of sizes to fit your needs—1½, 3, 6, 12, 18 and 27 cu. ft. Write for Bulletin 703 to PANGBORN CORP., 1500 Pangborn Blvd., Hagerstown, Md. *Manufacturers of Blast Cleaning and Dust Control Equipment.*



Pangborn blast cleans cheaper

There's
only one snowflake
like this ☞



and there's
only one trade-mark
like this ☞

TIMKEN®

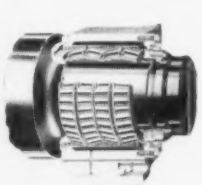
THERE'S only one Timken and it's a registered trade-mark—stamped on every Timken Company product. It means the name "Timken" is the property of The Timken Roller Bearing Company *alone.*

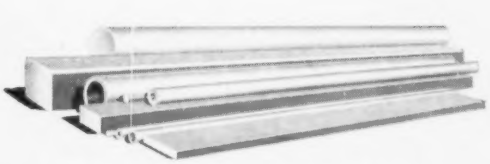
It means even more to you. When you say "Timken", you know you'll get the highest quality tapered roller bearings, fine alloy steel bars, seamless steel tubing or removable rock bits—all products of the Timken Company. Industry has made it a habit to look for the trade-mark "Timken" when looking for quality and value. It's a name with more than 55 years experience behind it. A name 15,000 Timken Company employees work very hard to keep on top.

That's why it pays to remember that "Timken" is a trade-mark, not just a type of product.

So to be *sure* you get the best, look for the trade-mark "Timken". It's your assurance of quality.

The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".





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